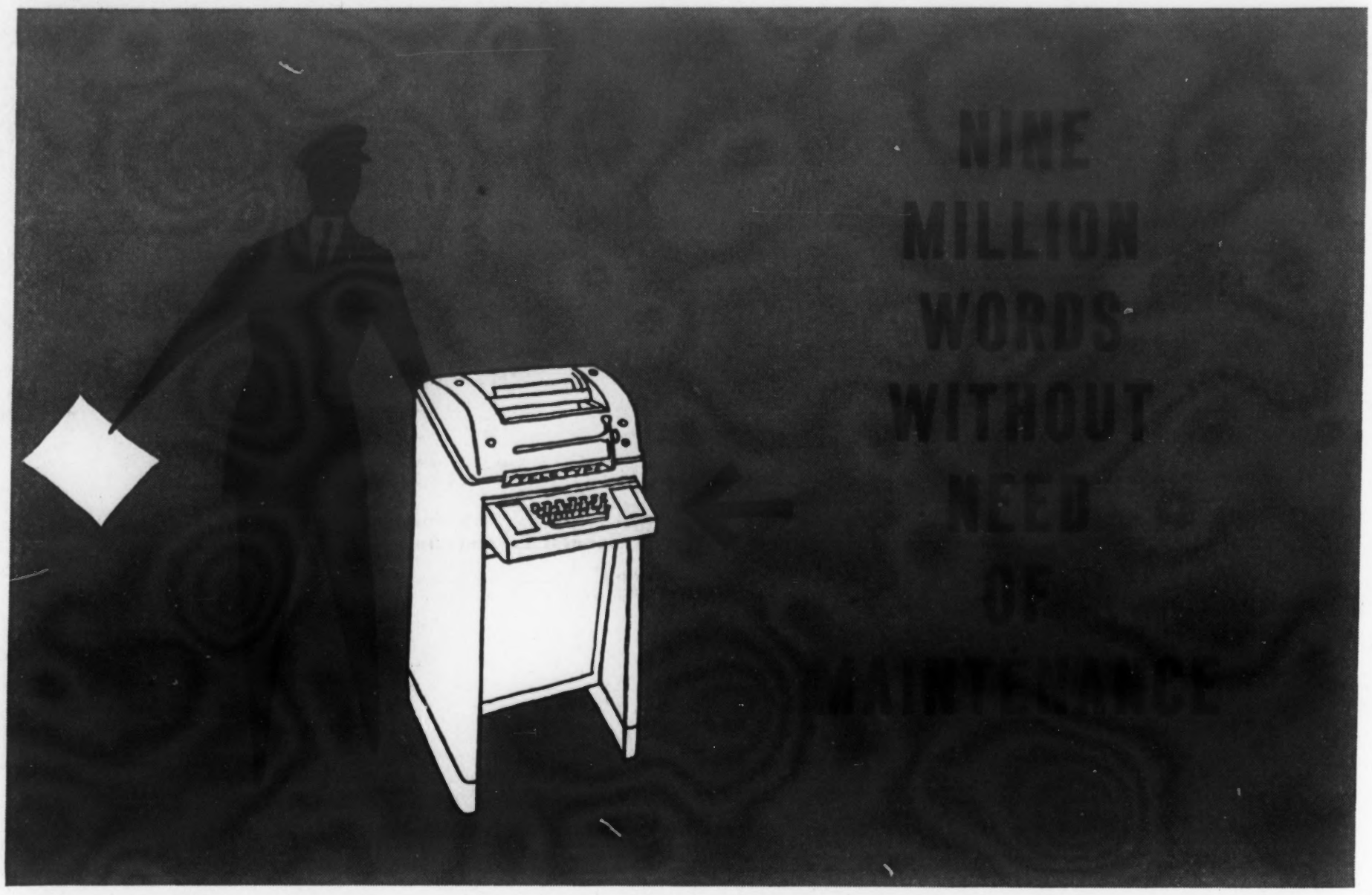
SIGNAL

December 1958



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Cover

SIGNAL's cover represents Christmas Greetings from the Directors, Officers, the Executive Committee and Headquarters of the Armed Forces Communications and Electronics Association.

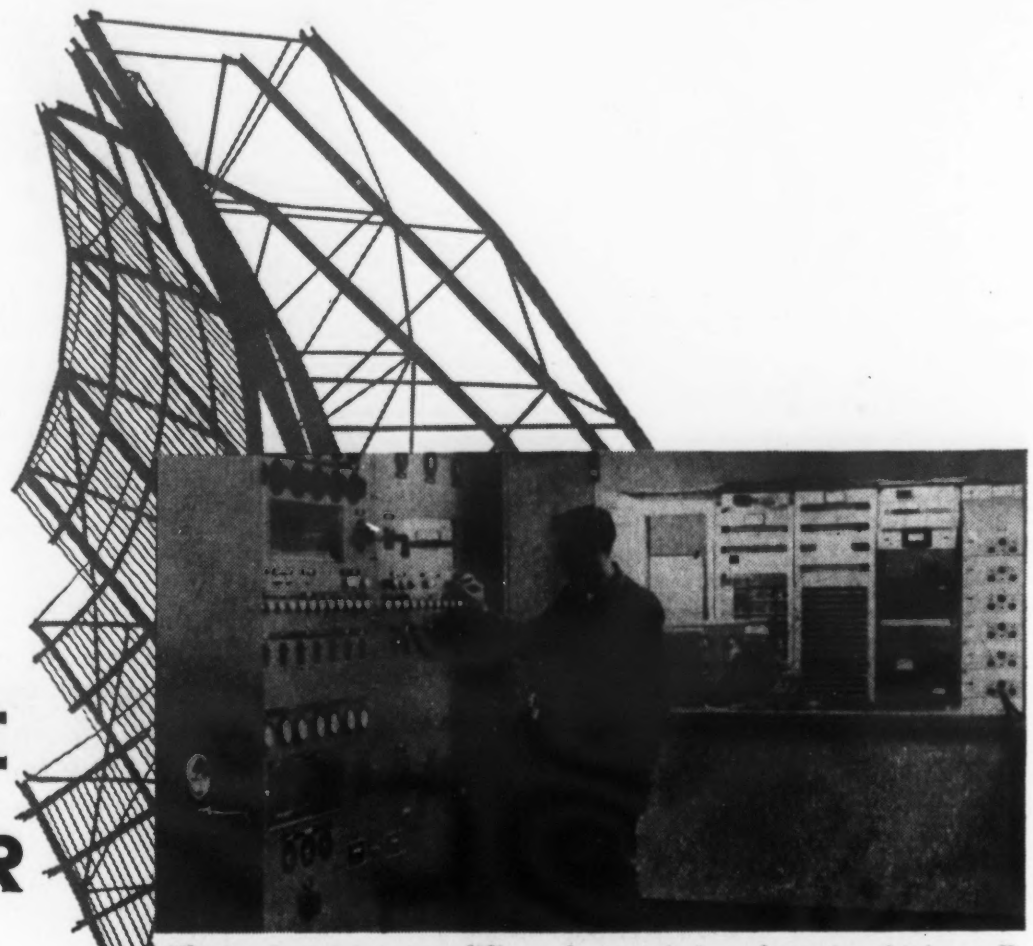
For the outstanding contributions of our authors and for the continuing support and services of our advertising representative and the advertisers in SIGNAL; for the complete cooperation of our printer, engraver, artist, members and friends, the editorial staff of SIGNAL is profoundly grateful and wishes to add its sincere holiday greetings.

Authors are entirely responsible for opinions expressed in articles appearing in AFCEA publications, and these opinions are not to be construed as official or reflecting the views of the Armed Forces Communications and Electronics Association.

**A Stockpile Article.*

FIRST LONG DISTANCE TROPO SCATTER SYSTEM PROVES

- **SSB best for long tropo hops**
- **Longer high-quality hops now feasible**
- **High power is no problem with G-E amplifier**



Klystron power amplifier of new design, featuring higher efficiency, reliability and lower operating cost. The entire system was designed by MIT Lincoln Laboratory in conjunction with Air Force Air Research and Development Command.

Control room showing control console and teletype machines. The system has been designed for ease of maintenance and operation to cope with extreme weather conditions.

Operation of the world's first *long* distance single sideband tropospheric scatter system proves the practicality of SSB for over-the-horizon hops of several hundred miles. Spanning 640 miles between sites near Boston and Winston-Salem, multi-channel voice and teletype communications are maintained with high reliability.

With this system General Electric demonstrates the inherent advantages of SSB for long distance transmission: the ability to get more wide-band signal over long one-hop distances with less power, at less cost.

When considering long-distance communications, remember General Electric's many years of experience in the design and manufacture of high power amplifiers, a key limiting factor in tropo scatter system design. And G-E engineers possess the practical system "know-how" so essential in the design and installation of long-range communication systems. Call these engineers to study your requirements. Military-Industrial Sales Technical Products Department, General Electric Company, Electronics Park, Syracuse, New York.

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GENERAL ELECTRIC

SENATOR LEVERETT SALTONSTALL

GOVERNMENT PROCUREMENT AND NEW WEAPONS DEVELOPMENT SYSTEM

SENATOR LEVERETT SALTONSTALL, ranking Armed Services Committee Republican, has proposed major reforms in the procurement system of the armed services. The bill (S4294), introduced before the adjournment of the 85th Congress, recommends a new method for increasing small business participation in Defense contract dollars.

Senator Saltonstall said that he had no expectation of action on his proposed legislation prior to the 86th Congress, but he urged a complete investigation of Defense procurement, on which "we expend twenty-two billions annually," between Congressional sessions. Presentation of the bill at the close of the last session was done in order to have it "referred to the Armed Services Committee so that appropriate study may be made of it during the adjournment of Congress."

The Massachusetts Senator offered several recommendations to reduce lead time in new weapons production:

• expansion of the "weapons system" procurement concept to all major military operational systems. This concept involves the selection of a single prime contractor who is responsible for the total development of a given weapon, using all resources available to him through subcontracting. Senator Saltonstall pointed to the speed, efficiency and lack of duplication under the weapons system concept.

• use of "performance" specifications instead of elaborate detailed specifications now required. The Senator pointed to "flagrant administrative log-jams such as 18-page specifications which were prepared to describe a ping pong ball."

• encouragement of commercial-type items where full and free competition is available to avoid duplication in the special design of equipment for the military.

• requirement that incentive or fixed-price contracts be used in every case possible, to promote maximum efficiency and incentives for industry to use its ingenuity to the fullest extent.

• exemption of incentive and fixed-price contracts from the Renegotiation Board proceedings. Under the incentive contract, if a contractor effects savings, the bulk of those savings are returned to the government and a small percentage retained by the contractor. Thus, economy and efficiency are encouraged; however, the Renegotiation Board recaptures these added profits, thereby nullifying the incentives to save for the government. Renegotiation sometimes takes five years at great administrative costs to the government.

• requirement that major prime contractors extend full subcontract opportunities to small business and follow government procedures with respect to increasing small business participation in subcontracts.

• flexibility in the procurement process; open competitive negotiation to be placed on equal status with formal advertising; negotiation to be permitted in an additional instance to those circumstances now covered by law, i.e., the Defense Department may negotiate in order to insure suitable quality. Notable examples might be in the fields of life saving devices, parachutes, etc.

The Senator emphasized two principal objectives for this legislation: (1) shortening of the lead time in the development and production of new military weapons and (2) promoting efficiency and economy in the procurement processes of the Defense Department.

"We cannot on the one hand criticize the Defense Department for delays and inefficiency, "Saltonstall cautioned, "when at the same time we impose inordinate administrative burdens through some of our statutes

and neglect their modernization . . . Congress must insure that its own house is in order."

"These changes in the law . . . would have a profound effect upon the procurement procedures of the Defense Department," the Senator concluded. "With the removal of many unnecessary, time-consuming and expensive technical and administrative requirements, we would release the great energy of American industry and logically consolidate authority with responsibility."

The Senator supported his conclusions with illustrations of delay and duplication in the production of new weapons. He noted the requirements for contractors to submit every minute engineering detail to scores of offices and committees, while overhead costs mount and essential defense jobs are delayed. Under the Saltonstall proposal, adequate authority would be delegated with responsibility—a requirement described as essential by Armed Services Committee witnesses last winter.

Senator Saltonstall, who is also a member of the Senate Small Business Committee, urged new and "realistic" approaches to the small business procurement problem. As weapons systems become more complex, he noted, small business has less opportunity to participate in prime contracts. "If major prime contractors are . . . required to use government procurement procedures with respect to small business contracting, the ultimate share of Defense Department procurement dollars which end up in the hands of small business . . . will increase rather than decrease," the Senator predicted.

Describing the responsibility to modernize our procurement procedures as "urgent," the G.O.P. Conference Chief warned that our nation's security may be threatened by a week's delay in the procurement of a new weapon . . . "The future security of our nation may depend upon our ability to conquer the problems of lead time."

The provisions of the S. 4294 bill would amend chapters 137, 139 and 141 of title 10 of the United States Code as follows:

• Section 2 would amend section 2301 of chapter 137 by extending the policy of Congress with respect to procurement made under such chapter as follows:

That products and services of a commercial character which are readily available on open market be procured whenever they will properly and efficiently satisfy agency needs; That small business concerns receive a fair proportion of procurement made by subcontracts from prime contractors. (The policy declaration now provides only that small business concerns should receive a fair proportion of procurement made by prime contracts.)

• Section 3 would amend section 2304 (a) of chapter 137 by specifically authorizing the use of competitive negotiation as an unconditional alternative to formal advertising in procurement covered by chapter 137. Section 2304 (a) now permits negotiated procurement of any kind only in 17 specified exceptions from a formal advertising. Competitive negotiation is negotiation with more than one supplier and is distinguished from unqualified negotiation in that the former entails public solicitation of proposals from interested suppliers and competitive evaluation of proposals received.

• Section 4 would amend section 2304 (a) of chapter 137 by adding a new (18th) exception from the general requirement that procurement purchases and contracts from the formal advertising (or competitive negotiation, after the amendment provided in section 3 (b) of the bill), viz, to insure procurement of property or services of suitable quality.

• Section 5 (a) would amend section 2305 (a) of chapter 137 to conform to the change in section 2304 (a) of such chapter provided in section 3 of the bill by requiring that solicitation for proposals (as well as bids as now provided in section 2304 (a) in competitive negotiation be made a reasonable time before purchase or contract.

• Section 5 (b) would amend section 2305 (b) of chapter 137 to conform to the changes in sections 2304 (a) and 2305 (a) of such chapter provided in sections 3 and 5 (a) of the bill, respectively, by limiting the provisions of section 2305 (b) to formal advertising. These provisions relate to bids and awards and are not opposite to competitive negotiations.

• Section 5 (c) would amend section 2305 of chapter 137 by adding a new provision requiring that specifications describe property to be procured in terms of functional performance characteristics unless another type of specifications would be more efficient for the procurement of the particular property.

• Section 6 (a) would amend section 2306 (a) of chapter 137 by requiring the use of fixed price or incentive contracts unless another kind of contract is authorized as better promoting the interests of the government. In other respects section 2306 (a) would not be changed, i.e., its prohibition on the use of cost-plus-a-percentage-of-cost contracts would be continued, and the limitations in subsections (b) to (e) of section 2306 would be left intact except as provided in section 6 (b) of the bill, infra.

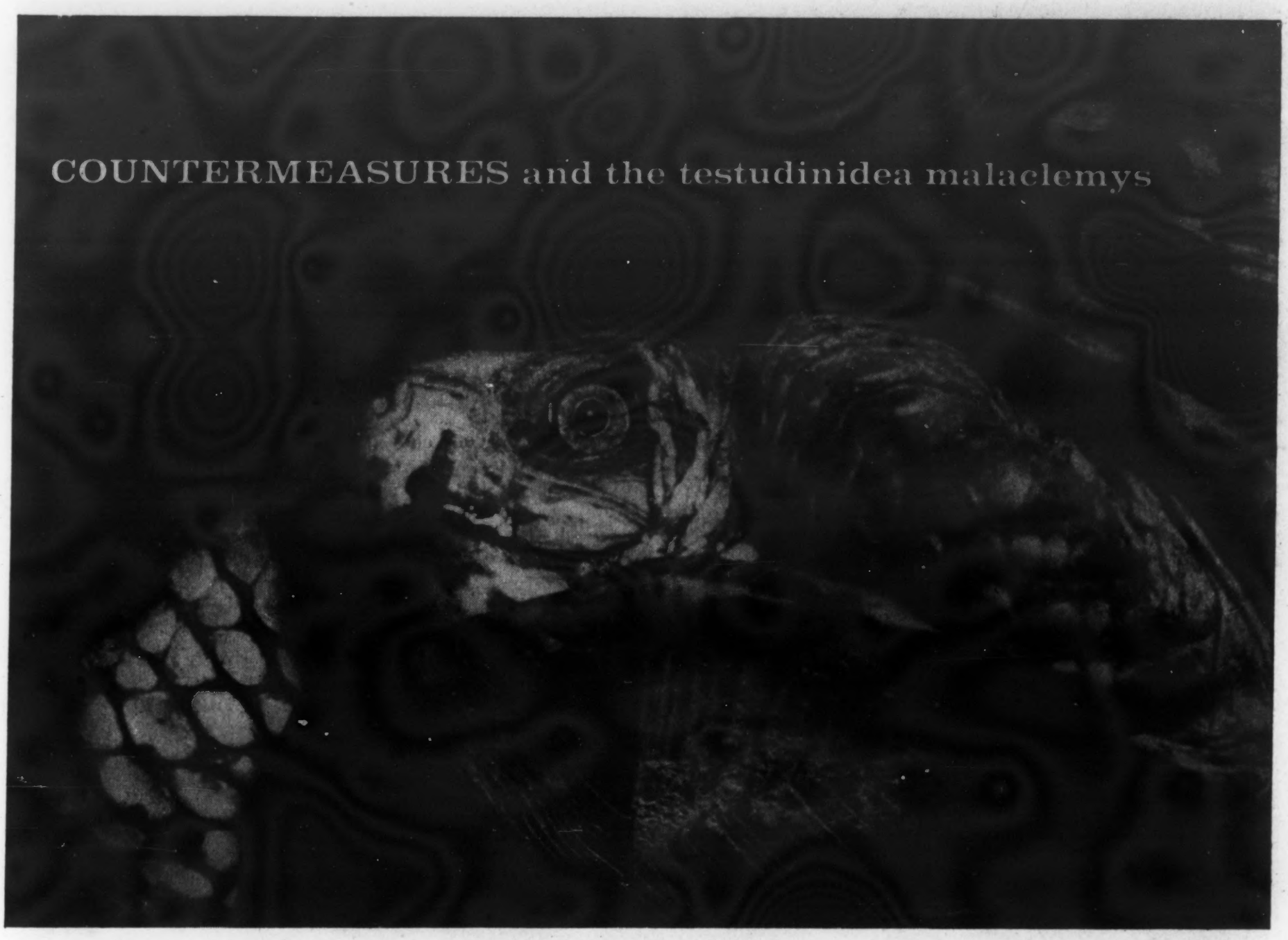
• Section 6 (b) would amend section 2306 (c) of chapter 137 by deleting therefrom reference to incentive contracts. This would in effect remove limitations now provided on the use of incentive contracts. Section 2306 (c) now conditions the use of cost contracts, cost-plus-a-fixed-fee contracts, or incentive contracts on a determination (i) that such a contract is likely to be less costly than any other kind of contract or (ii) that it is impractical to obtain property or services of the kind or quality required except under such a contract. Section 6 (b) of the bill would delete incentive contracts from the aforesaid conditional prohibition.

• Section 7 would amend section 2353 of chapter 139 by adding a new subsection requiring that all military procurement contracts must provide for reimbursement of the department making such a contract by the contractor for the cost of any advisory engineering services rendered by government personnel to the contractor or subcontractors incidental to the contract.

• Section 8 is self-explanatory. It would amend chapter 141 by adding a new section 2387 thereto defining the term "operational system," and providing for the designation and procurement from a single prime contractor of operational systems by the military departments. Subsection 2387 (f) would provide for participation by small business concerns as subcontractors. This section of the bill would provide for a statutory definition and an expansion of the so-called "weapons system" method of military procurement under a single manager which has been developed and used in the military departments.

• Section 9 would provide that the provisions of the Renegotiation Acts of 1948 and 1951 shall not apply to incentive contracts or to any contracts entered into after formal advertising or competitive negotiation.

• Section 10 would provide that the provisions of the bill would take effect 2 months after its enactment.



FORTUNATE, INDEED, IS THE TURTLE
for he carries his countermeasure right on his back . . .

Man on the other hand must devise his own countermeasures if he intends to survive in this day of modern warfare. Instruments For Industry is actively engaged in this field working in close conjunction with the Army, Navy, Marines and Air Force.

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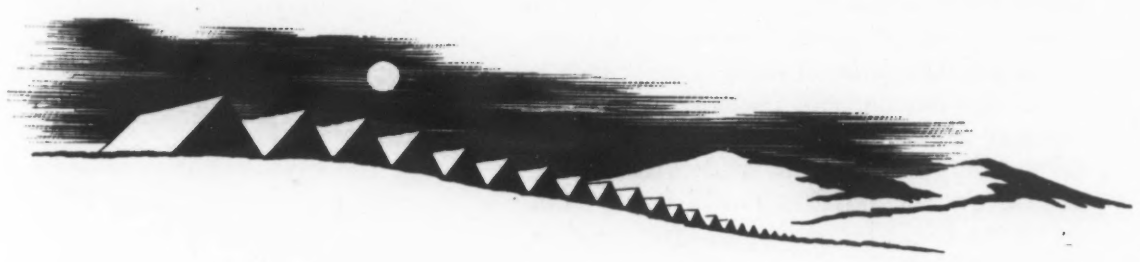

An I.F.I. "ceiling of safety" protects these men against surprise ballistic attack.

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TV in military education

With television firmly established in the pattern of modern American life, the twisted antenna has become a spectral fixture on the American skyline.

Each day millions of Americans turn to television for entertainment and relaxation. Others look to it as a medium for keeping up with the day's events. It has become as much a part of family life as the supermarket.

However, there are many other facets to this video phenomenon that are not immediately apparent to the general public. One of these is the use of television as a tool of education.

Several years ago, when television was still in the experimental stage, reports on its value as an educational aid uncovered some surprising conclusions. Research showed that school children gave more attention to televised subjects and that they remembered, with surprising accuracy, the material presented on TV. Also, it allowed a freedom of presentation aimed at stimulating children to seek additional reading.

Probably its biggest asset, as uncovered by educational television research, was its success with low aptitude students. "Slow learners" acquired, through television, some of the facts and skills that they did not learn through reading and that they had no desire to learn by any other means.

Because of this progress in a relatively new field, the public eye has been trained on the future growth of educational television for classroom instruction in public schools. The U.S. Army also has sought to develop it as a means of education since it is potentially a medium of great importance for training masses of men in the event of total mobilization. To this end, the Signal Corps conducts a large amount of experimental and developmental activity at the U.S. Army's Signal Training Center (USASTC) at Fort Gordon, Georgia.

Briefly, this is what has been happening. A Television Branch was established in 1952 at the Southeastern Signal School, the education arm of USASTC. Its mission: experiment and research. After the TV Branch had been in experimental operation for four years, evaluation projects were conducted by the Human Relations Research Organization (HumRRO) of Columbia University. The aim was to determine the value and effect of TV on military education.

HumRRO ran a controlled study of 14 hours of miscellaneous instruction in which the verbal content of both the television and the normal classroom presentations were kept as similar as possible. What differed, to varying degrees, was the "picture" the trainees saw. After each hour of instruction, the students were given tests on the material covered. The results showed that in classes on manipulation of small parts, television was significantly preferable to normal instruction. The use of cameras with zoomar lenses and large 21-inch television monitors allowed students to examine closely every minute detail.

In courses concerned with the interrelationship of small moving parts, television allowed for closer scrutiny of parts that would have been difficult to place in their proper perspective had large mock-ups been used. For instance, a television camera equipped with a zoomar lens could focus on small parts of a teletype machine and, after showing a specific part, it could back away to show the placement of that part in the machine.

The advantages of television in educating soldiers seem limitless. It has been proven that "canned" lectures, made on kinescope recordings, can cut teaching time to a great extent. Proper planning of lecture scripts can insure the coverage of all essential points in the most concise manner. Kinescope recordings also offer a means of capturing the best presentations by the top instructors. Another advantage is that television recordings can provide a desirable standardization of teaching methods and materials. The recordings are used over and over for successive classes—a guarantee that all students are exposed to the same material in the same manner.

Kinescope recordings also have proved to be of great value as refreshers. It was discovered that after kinescope reviews, low aptitude groups approached the mean scores made by high aptitude groups that had been exposed initially to the material.

This is not to say that television has no limitations. The main complaint stems from courses that are designed primarily to stimulate effective thinking toward solving problems. That is, students are not able to ask questions during the progress of a televised lecture when a problem arises.

Television instruction utilizing zoomar lens to magnify small parts

However, this problem can be handled by using television to transmit only certain types of material, particularly information that would be difficult to teach effectively in the regular classroom. After transmission of the necessary material, the receiver is turned off and the instructor and students may further develop the subject by conference methods.

In summary, television has proven its worth with very few limitations. And these can be eliminated through adequate planning.

In the early months of 1957, the commanding general of the Signal Trainmanding general of the Signal Training Center, with concurrence of OCSigO, proposed an expansion program with these definite objectives: (1) to expand the closed-circuit distribution system to reach all courses currently conducted in the U. S. Army Southeastern Signal School, (2) during fiscal year 1958, to support these courses with fifty periods per week of televised instruction, and (3) during fiscal year 1958, to expand this support to one-hundred hours per

week of combined kinescope and live telecasts.

The summer of 1957 saw the initiation of procurement to supplement or replace equipment on hand. Modification work began on a building to accommodate television studios. On October 16, 1957, Undersecretary of the Army Charles C. Finucane officially placed the Television Branch in operation at its new location.

At present, the Television Branch is transmitting between 30 and 38 hours of televised instruction to various courses each week. While televised instruction is more practical for some courses than for others, every course has used kinescope recordings to a certain extent. The Power Equipment Maintenance Course uses television most frequently, utilizing approximately 16 hours per week.

Also, some kinescopes are widely used throughout the school while others apply to only one specific course. Last year alone, some 3,500 students viewed a kinescope illustrating the proper method to make unsatisfactory equipment reports.

It may be well to emphasize that students are not dependent on television as their sole source of learning. Rather, instructors utilize it as an educational aid. The average kinescope, prepared on some phase of a course, lasts approximately 30 minutes. It is followed by a 10- to 20-minute discussion period in which students may raise any pertinent questions about the material covered.

The production of these kinescopes is a long process. But careful planning to assure complete coverage of the subject makes it a sure-fire system.

Preparation

The process begins when the Southeastern Signal School picks the phase of a specific course that is suitable for television instruction.

A board of technical advisors draws up a rough draft of the essential elements to be included in the kinescope. The rough draft is then sent to the Television Branch, where writers rework it into a smooth flowing script. As a precaution against any errors or omissions, the final script returns to the technical advisors for approval.

From the technical advisors, the already well-traveled script goes to the TV production board where the visual aids are incorporated and last minute production details are checked. Once the kine-recording is finished, a preview showing is held and the kine-recording approved.

To obtain the finished product takes the cooperation of almost 40 people. Currently, the Television Branch is producing at least one kine-recording every two weeks.

Besides presenting kinescopes, the Television Branch also transmits Army training films to the various classrooms, thereby reducing the administrative problems involved in transporting a single film to several different buildings.

An evaluation of the Television Branch would not be complete without a description of its spacious and modern facilities which are second only to those of the large commercial network stations.

Studio A

The main studio measures 40 x 60 feet with overhead clearance of 15 feet. Walls and ceiling are lined with fiberglass acoustical insulation. On either side of the studio entrance, double-plate glass windows provide visual access to the studio from both the control room and the building lobby. The outside wall contains a full length double door which provides entrance facility for vehicles up to the size of a 2½-ton truck with a communication equipment hut aboard.

Running the length of two walls from a point 10 feet above floor level are grey repp curtains with black acoustical lining. In addition to improving the studio appearance, these curtains help to exclude outside noise and serve as scene backdrops. When a dark backdrop is desired a panel is reversed to expose the black lining.

Near the remaining wall is a 13-foot by 50-foot cyclorama curtain mounted on a 95-foot aluminum track. The track contains a tight bend at one end of the studio to provide a corner backdrop. The other end of the track is mounted in a gradual curve to produce an illusion of distance in simulated outdoor scenes. The cyclorama may be draped or it may be stretched tight as a flat backdrop or to provide a reflecting surface for light patterns.

The studio is equipped with two RCA TK30 Image Orthicon cameras (mounted on pedestal dollys) and a tripod mounted RCA TK15 studio vidicon camera. Instructional shows produced by Television Branch frequently include cards and charts for illustration purposes. The vidicon camera is particularly useful for such scenes since it can be trained on high contrast subjects for considerable periods of time without image retention. Each camera is equipped with a standard lens complement and one studio zoomar lens will be available for use with image orthicon cameras.

A locally fabricated "periscope" consisting of two mirrors on an adjustable frame permit a variety of angle and overhead shots.

Normal audio pickup is by means of a RCA 77DX microphone attached to a perambulator boom while RCA BK1 and KB6 microphones are available for desk and concealed use.

Cable receptacles are installed in six locations along studio walls to permit operation and maneuverability in any area of the studio floor of cameras, microphones, monitors and intercommunication equipment with standard 50-foot cables.

Studio lighting is provided by a series of light strips mounted on cross

(*Continued on page 22*)

by Maj. Louie L. Williams
U.S. Army Signal Training Center
Fort Gordon, Georgia

Directors and technicians perform tasks during production of TV show

telecommunications progress

The Electronics Laboratory, School of Electronics, Automatic Telephone and Electric Company, Ltd., is pictured at right.

by H. R. A. Wood, Group Sales Co-ordinator, Automatic Telephone & Electric Co. Ltd., London, England

ONE NEED LOOK NO FURTHER than its name to establish at least one important activity of this Company — the manufacture of automatic telephone equipment. This, in fact, was the sole purpose of the formation of the Company in 1912, under its earlier title, Automatic Telephone Manufacturing Co. A. T. & E. has thus been associated with automatic telephony for nearly half a century, but its association with telecommunications dates back to 1884, through its predecessor Telegraph Manufacturing Co.

Immediately after its formation the Company acquired the British and Colonial patent rights of the Strowger step-by-step system which had been used successfully for a number of years in the United States. With this system the Company equipped the first public automatic exchange in Great Britain (Epsom), and a private automatic exchange in the Post Office headquarters at St. Martin's le Grand (Official Switch).

The Strowger system at that time had by no means reached the peak of its development, and the Company, in collaboration with Post Office engineers, evolved modifications and developments to bring the system into line with British practice in the handling of traffic, and in engineering arrangements. The Company later developed the register/translator (Director) which provided the digit translation facilities essential to metropolitan area dialing. This was an outstanding advance in automatic telephone switching technique which led to standardization on the basis of the Strowger system for the conversion of the British telephone network to automatic working.

During its early years the Company concentrated upon developing and manufacturing Strowger equipment for the British Post Office and many state and private telephone administrations abroad. To date the Company has produced Strowger equipment to provide for more than 2½ million public telephone subscribers. To achieve this output it was necessary to set up facilities for manufacturing on a very large scale and this, in turn, made it possible to produce small private automatic exchanges at reasonable cost. These were used for internal communication in factories, offices and the like, and although the term "small" is used, many of them were equipped to provide for hundreds of extensions. This became an important subsidiary activity of the Company which has continued to the present day. Sales, installation and servicing of the private exchange equipment in Great Britain is now carried out by a subsidiary, Communication Systems Ltd.

But automatic telephone switching techniques and components can readily be applied to other purposes, and the Company further widened the scope of its activities by adapting Strowger equipment for the remote control of switchgear, and remote indication of switch positions, meter readings, etc., in electricity, gas, water and oil distribution networks. The

Company has developed and installed many remote control schemes for the gas and electricity industries in this country and overseas.

In 1927 the Company began the manufacture of road traffic signal systems and, in 1932, installed the first vehicle-actuated system at the junction of Cornhill/Bishopsgate, London. This was a simple two-phase system with no "frills," but in the course of time the system has been developed to the point where it can provide for every conceivable road circumstance and traffic requirement. One of the most notable of the complex control systems devised is in operation at "Bank" London.

Earlier still, shortly after the First World War, the Company entered the field of mine telephone and signalling apparatus. Today in the coalfields of Great Britain, the Company is well known for its signalling systems to control the movements of the cage, and underground haulage, and also for other mine signalling and telephone communication equipment. In addition to being robustly constructed to withstand arduous working conditions, this equipment must meet the stringent safety requirements of the Ministry of Power. These activities have grown to such an extent that, like the private telephone business, they are now handled by a separate company, A. T. & E. (Wigan) Ltd.

Meanwhile, to return to its major activity, the Company had begun in the 'tween war years to concern itself with the techniques of long-distance signalling and dialling, line, cable, radio and telegraph transmission necessary to the provision of telecommunications service on a national scale. Some of the Company's earliest work on VF signalling and dialling systems which facilitate the transmission of supervisory and dialling impulses over long distance communication channels was produced for the telephone networks of Portugal and South Africa.

Carrier telephone and audio frequency telegraph equipment for use on open-wire lines has in recent years been supplied by A. T. & E. Co. for the telecommunications networks of Australia, East Africa, India and many other countries. There are, in fact, several hundred carrier systems of the Company's manufacture—with a total route length of many thousands of miles—in service in all parts of the world. At present the Company is installing in New Zealand, coaxial carrier systems — with an ultimate capacity of 960 telephone circuits per pair of coaxial tubes—to link Wellington with Palmerston North, and Auckland with Hamilton. It is also supplying radio channelling equipment for use in conjunction with a microwave radio link between Palmerston North and Hamilton. When completed, these installations will form the main trunk route in the North Island.

The continual expansion of the Company's activities has involved corresponding expansion of premises and staff. Starting in 1912 with 800 employees and 80,000 square feet of factory floor space the Company and its associates now has more than fifteen-thousand on its payroll and one and a half million square feet of floor space. In addition to its main factory, Strowger Works, the Company has four other factories in the Liverpool area.

Apart from the A. T. & E. (Wigan) factory, associated factories are maintained at Bridgnorth—A.T. & E. (Bridgnorth) Ltd. and at Ruislip—Hivac Ltd. The Bridgnorth factory produces V.H.F. radio telephone equipment, frequency shift telegraph apparatus, together with radio, radar and other electronic equipment. Hivac Ltd., as the electronics division of A.T. & E. Co., produces electronic, thermionic, and semiconductor devices for the parent Company and its associates, as well as supplying these direct to its own customers.

A.T. & E. Company's own considerable research and development resources are supported by British Telecommunications Research Ltd. at Taplow, an organization jointly owned by A.T. & E. Co. and British Insulated Callender's Cables Ltd. B.T.R. Ltd. has a research staff of 350 scientists and technicians engaged upon the development of systems and equipment for cable and radio transmission, electronic telephone switching and telegraphy.

The Company which 46 years ago set out to manufacture electro-mechanical automatic switching equipment, and has built itself up into a powerful organization with a world-wide reputation has for a long time been preparing itself for a new future, in which electronics will play a very large part. It is inevitable that electronic exchanges will eventually supersede electro-mechanical systems, but this will take time, if only for the reason that existing equipment still has the best part of its operating life before it. Meanwhile A.T. & E. Co. has produced one of the first electronically-controlled telephone exchanges to go into service as a practical working unit. It has also bettered an earlier achievement by producing a register/translator which is capable of routing over a hundred telephone calls to different destinations simultaneously. This is now undergoing practical working trials in Lea Green exchange, London. Both of these developments employ the "magnetic drum" information storage technique.

To insure that it has a steady flow of research and development personnel equipped to apply the science of electronics to telecommunications problems, the Company has established its own post-graduate School of Electronics. Although intended primarily for students leaving universities and technical colleges, the facilities of the School are available to selected Company members who have the necessary academic qualifications.

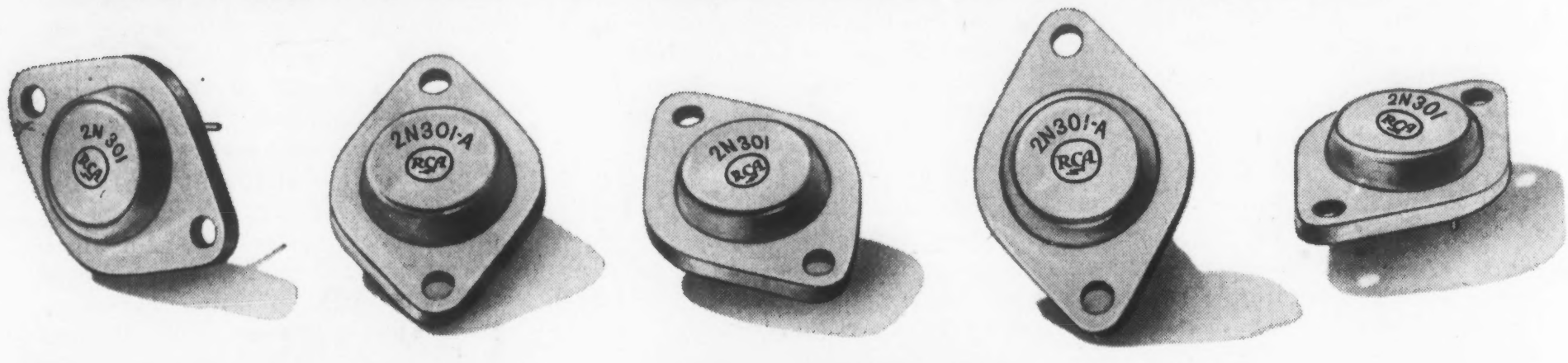
The growth of Automatic Telephone Manufacturing Co. into the vast telecommunications organization known as The A.T.E. Group has resulted from a happy combination of technical knowledge, manufacturing skill and administrative ability contributed by the many capable men it has been the Company's good fortune to employ. But no one person has played a greater part in the development of the Company than its Chairman, Sir Thomas Eades.

Sir Thomas joined the Company in 1912 as an accountant, later being appointed Commercial Manager and then, in 1933, General Manager. He was appointed Managing Director in 1936 and, in this capacity, shaped the course of the Company for more than 20 years—years which have offered greater challenges than any other period in the Company's history.

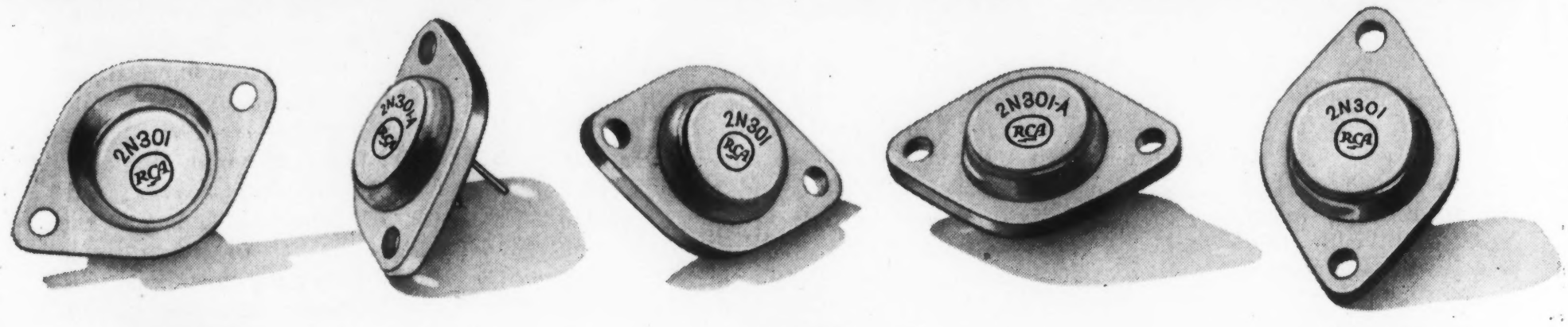
Knighthood was conferred upon him in 1945 in recognition of his services in the telecommunications and aeronautical instrument industries.

Sir Thomas Eades
Chairman
Automatic Telephone & Electric Co. Ltd.

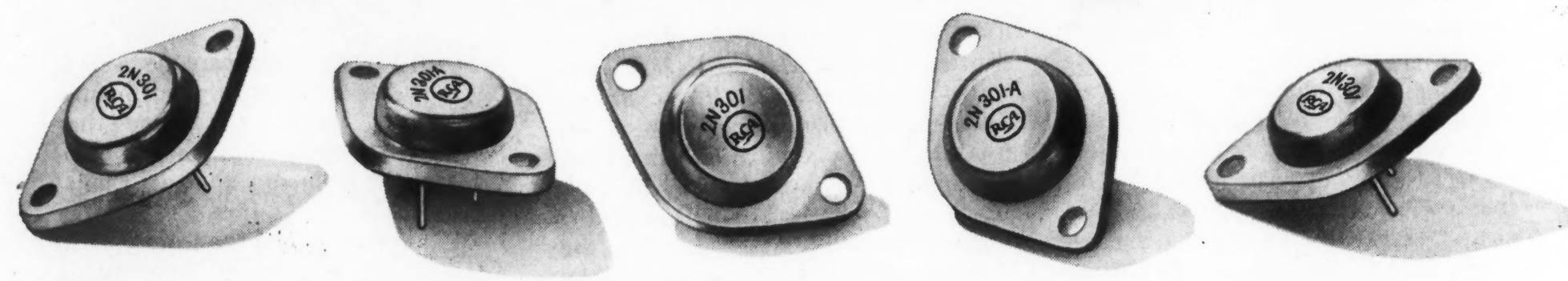
Now...RCA 2N301 2N301-A



deliver 85% more



Power Output!



New, improved RCA-2N301 and RCA-2N301-A—now can provide an audio-frequency power output up to 5 watts in class A service at a mounting-flange temperature of 80°C—a significant increase (85%) over the original class A power output of 2.7 watts! These two units offer high reliability, high power efficiency, and low-distortion characteristics in power output stages of automobile radios, high-fidelity amplifiers, juke boxes, intercoms, PA systems, marine and mobile communications equipment, and electronic musical instruments.

RCA also announces the addition of three types to its expanding line of POWER OUTPUT TRANSISTORS: 2N176, 2N351, 2N376. For additional information on these types and the complete line of RCA transistors, contact your RCA field representative at the field office nearest you. For technical data on RCA POWER TRANSISTORS listed above, write RCA Commercial Engineering, Section L-60-NN, Somerville, N. J.

MAXIMUM RATINGS				TYPICAL OPERATION▲		
				Class A Service		Class B Service
Type	Collector▲ Dissipation Watts	Peak Collector-to-Base Volts	Peak Collector Current Amperes	Max.-Sig. Power Output Watts	Power Gain db	Max.-Sig. Power Output (2 transistors) Watts
2N301	11	—40	—3	5	33 at 5 watts	12
2N301-A	11	—60	—3	5	33 at 5 watts	12
2N176	10	—40	—3	2	35.5	—
2N351	10	—40	—3	4	33.5	—
2N376	10	—40	—3	4	35	—

▲At mounting-flange temperature of 80°C

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Somerville, N. J.

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THE RADIO AMATEUR*

** America's secret weapon*

by ***Brig. Gen. John Bestic*** *Deputy Director, Communications-Electronics, Headquarters USAF*

RECENTLY while testing a new six and two meter amplifier, I found that I had developed what seemed to be a new and significant advance in the communications art. Hastily I scrapped the remarks which I had intended to make in order to explain in detail this exciting and revolutionary new development. I entitled this: "How To Put Out More Power On TV Channels 7 And 2 With A Pair Of 807's Than A 50,000 Watt TV Transmitter." Bursting with pride at this remarkable technical achievement and anxious to inform all segments of the communications field of this new technique, I hurriedly sent off my manuscript to our good friends on the Federal Communications Commission. Unfortunately, there has been some little confusion. For instead of returning my manuscript with an official indorsement, the commission has mistakenly sent instead a little pink ticket.

The amateur radio hobby is a fascinating art. It combines personal skill in the tremendously important field of electronics with the opportunity to communicate with other amateurs worldwide. By combining this personal skill with operating proficiency, both developed in the practice of our hobby, we provide unparalled avenues of public service. As a working amateur, I am admittedly biased in favor of amateur radio. But looking at the amateur service objectively, it is my conviction that no other hobby, avocation or pastime offers this country more in the form of service than amateur radio.

From a humble beginning at the turn of the century, amateur radio has grown into an established institution. American radio amateurs alone number over one-hundred-fifty-thousand trained communicators. I wonder how many readers have pondered the significance of the term "trained communicators." In the military, as in industry, communications tasks have become highly specialized. The field is broken into propagation experts, antenna designers, maintenance technicians and the like. Very few of the industry-military teams are versed in all phases of the art and it is in this field of all-round versatility that the highly skilled amateur, proficient in all phases of the communication field, excels. Both military and industry look to amateur radio, for from the amateur ranks will come the professional communications specialists and executives of tomorrow.

Admittedly, amateur radio is a grand and glorious hobby but this fact alone would hardly merit such wholehearted support as is given it by our government and the public at large. Acceptance and encouragement of amateur radio is based upon two factors. The first is the thorough appreciation by the military and civilian defense authorities of the value of amateur radio both in peace and war. The second is that intangible factor, already mentioned, known as "public service."

During the First World War, at least 4000 of an estimated 6000 amateurs contributed their skill and ability. The Armistice of 1918 left the military establishment aware of the contribution to the war effort made by amateur radio. The contribution was doubly valuable then because skilled communicators were available in quantity only from the ranks of amateur radio. The cordial relations between the amateur and the Army and Navy were strengthened through the years. In gradual steps, an organized symbol of military-amateur cooperation evolved in 1925, when the Navy Communications reserve and the Army Amateur Radio System were developed. As you know, these organizations exist today. The Navy system in pre-World War II form and the old Army system supplanted by the Joint Army Air Force Military Affiliate Radio System.

The brilliant record of the amateur in World War II is well known. Army, Navy and Air Corps searched their ranks for radio amateurs. Over 25,000 individual amateur radio operators served with distinction with our Armed Forces. Other thousands were engaged in vital electronic research, development and manufacturing and found time to staff the World War II counterpart of the present races program, the War Emergency Radio Service.

The "public service" record of the radio amateur is a brilliant tribute to his technical skill, operating ability and selfless dedication to his fellow Americans.

Since 1913, amateur radio has been the principal and, in many cases, the only method of outside communication in several hundred storm, flood and earthquake emergencies in this country. In recent years, amateur emergency services have been outstanding—from the Eastern States floods of the thirties, the hurricane and tornado disasters of the forties, to the flood disasters of the past few years. In these disasters, as in many others—tornadoes, sleet storms, forest fires, blizzards—amateurs have played a leading role in providing communications for the Red Cross, police and fire departments, railroads and many other vital services.

This outstanding record of organized emergency action prompted the Federal Government to establish special regulations setting aside frequencies for exclusive amateur use for civilian defense purposes. We are particularly proud that our service alone should be given this evidence of both trust and dependence by our nation.

The Air Force has a many-fold interest in the amateur communications art. It would be hard to single out any one phase of the amateur service particularly deserving recognition, but I would be remiss in my duties as an Air Force Communicator without a word on the services, to the military establishment

(*Continued on page* 25)

military electronics

ASW AND UNDERSEA WARFARE

- SE Submarine communications and detection.
- SE ASW data processing and display aids.
- PP ASW listening and retransmitting devices.

SPECIAL DEVICES

- SE Proximity warning.
- SE Long range electronic surveying equipment with airborne repeater.
- DS Electronic fusing.
- DS Electronic surveying equipment.
- DS Pulsed light range measurement equipments.
- PP Radiosonde transmitter and preamplifier.

MISSILE AND DRONE CONTROL

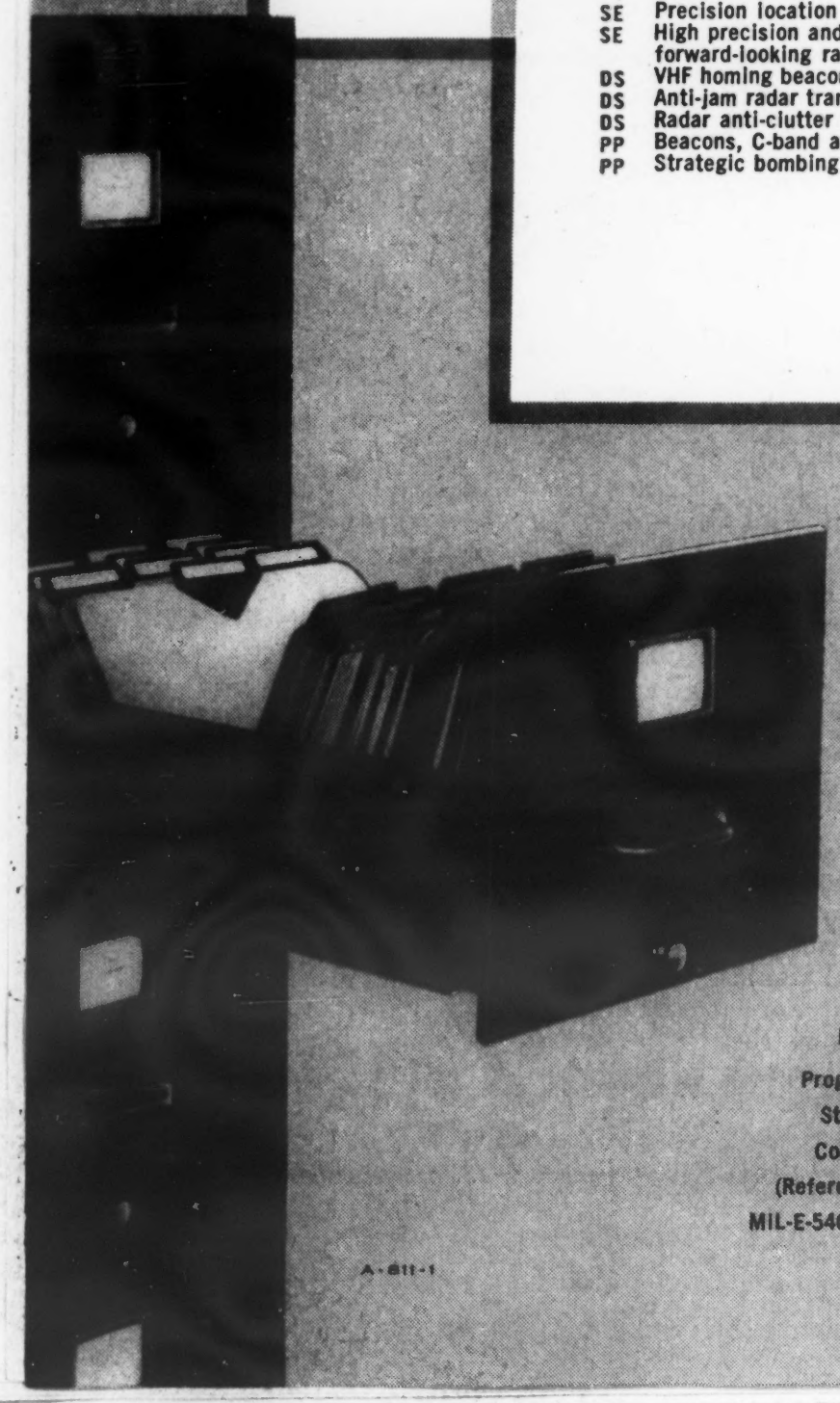
- SE Precision inertial-guidance system for short range air-to-surface missile.
- SE Bomber defense missile system.
- DS Homing guidance system for attack and reconnaissance drones.
- DS Air-to-air radar guidance system.
- DS Surface-to-surface radio inertial guidance system.
- DS Drone command guidance system.
- PP Data transmission and processing for surface-to-air missile guidance.
- PP Surface-to-air radar guidance system.

SENSORS

- SE Precision location of radars.
- SE High precision and high resolution forward-looking radar.
- DS VHF homing beacon for supply-drop aircraft.
- DS Anti-jam radar transmitter and receiver.
- DS Radar anti-clutter receiver.
- PP Beacons, C-band and X-band.
- PP Strategic bombing radars.

COMMUNICATIONS AND DATA TRANSFER

- SE Obstacle-gain data transmission.
- SE 18-Channel teletype.
- SE Noise-modulated data links.
- DS Integrated battlefield air mobile radio communication system.
- PP High-density FM voice multiplex.
- PP Integrated battlefield ground mobile radio communications system.
- PP High density UHF communication system for air defense.
- PP Coded secure communications.
- PP Pulse code modulated communication equipment.
- PP Multitone and digital selective calling equipment.
- PP Transportable and fixed-station microwave wide-band relay equipment.
- PP AM, FM and SSB voice and data communications equipment.
- PP I.F.F. equipment.
- PP Data link and logic for ground-to-air command guidance of aircraft and missiles.
- PP Miniaturized Transceivers.



Here is an unclassified look at representative Motorola military electronics programs...past and current. Necessarily incomplete, the listing includes only enough projects to demonstrate the breadth of experience at Motorola's Military Electronics Division. For detailed information on how Motorola's capabilities can be applied to your problem...or for data on engineering career opportunities...please write: Motorola, Inc., Military Electronics Division, 8201 East McDowell Road, Phoenix, Arizona.

KEY:

Program Status Coding (Reference MIL-E-5400B)

- SE *Study programs or programs resulting in experimental models.*
- DS *Programs resulting in developmental and/or service test models.*
- PP *Programs resulting in pre-production prototypes and/or production models.*

A-811-1

s experience/ on file at Motorola

COMPONENTS

PP Quartz crystal resonators and filters.
PP Electrical wave filters.
PP Electromechanical filters.
PP Precision V.F.O.'s and B.F.O.'s
PP Electromechanical reed filters and tone generators.
PP Transistorized power converters.
PP Transistorized voltage and current regulators.

NAVIGATION

SE Doppler personnel navigator.
SE Inertial sensors.
SE Supersonic intercontinental bombing-navigation system.
SE Hyperbolic battlefield navigation system for aircraft, land vehicles and man pack.
DS Hyperbolic amphibious navigation system.
PP Aircraft rendezvous and station-keeping systems.

DATA PROCESSING AND DISPLAY

SE Automatic data processing for electronic countermeasures.
SE Data processor for electromagnetic intercept.
SE Threat evaluator for air defense.
PP Shipborne electronic data system for air defense.
PP Large-scope bombing radar indicator.

ELECTRONIC WARFARE

DS Battlefield electronic warfare.
DS False target generation system.
DS Tracking jammer.
PP Subminiature passive radar illumination detector.

GROUND SUPPORT AND TEST EQUIPMENT

PP Phase-lock telemetry.
PP Command destruct receivers.
PP Guided missile test equipment.
PP Programmed automatic test system.
PP Aircraft test equipment.
PP Militarized precision pulse circuit testers.

SOLID STATE MATERIALS AND DEVICES

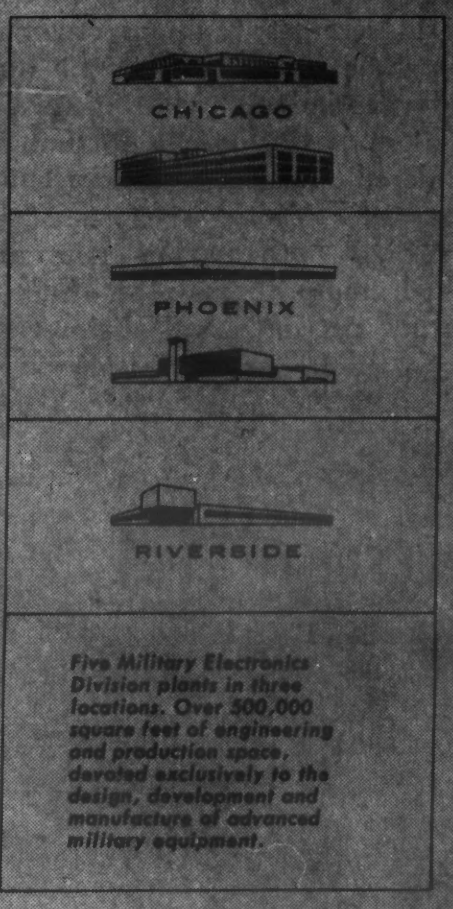
SE Ferro-electrics.
SE Ceramics.
SE Solid state devices.
PP Ferrites.

COMBAT SURVEILLANCE

SE Drone guidance, data sensor, and data transmission integrated reconnaissance system.
SE Aircraft data sensor, and data transmission reconnaissance system.
PP High resolution side-looking radars for aircraft and drones.

MOTOROLA

Military Electronics Division / CHICAGO • PHOENIX • RIVERSIDE



Five Military Electronics Division plants in three locations. Over 500,000 square feet of engineering and production space, devoted exclusively to the design, development and manufacture of advanced military equipment.

CRISIS *and*.....

CHALLENGE

by Theodore A. Distler
Executive Director
Association of American Colleges

IT IS OF THE GREATEST importance to the national interest that all of us who care about higher education bear constant witness to the fact that the educational garment is without seam. What we call liberal education —which I may define as education for creative living and mature citizenship—is, or ought to be, the same everywhere and always, no matter who purveys it or under what auspices.

Only by a united endeavor, which allows for difference of tradition and affiliation, but places the common interest ahead of the sectional interest, can we hope to solve the problems that confront us. Make no mistake, for we are faced with problems of the utmost gravity.

A year ago this past October, the American people learned to their dismay that their educational system, whose vast superiority over all other systems they had cheerfully taken for granted, was not so perfect after all. A nation which we had been taught, at one and the same time, to regard as an imminent danger to peace and freedom and to despise as technically backward, had beaten us in the race to put a satellite in orbit.

At a stroke it became more doubtful if the superior power of the USA, on which people were relying in the last resort for the defense of the free world against Communist imperialism, was anything but an illusion. This was indeed a chilling revelation. It at once let loose a torrent of bewildered questions, angry denunciations and idiotic proposals. Politicians of both parties—for reasons which may or may not have been purely patriotic and disinterested—demanded investigations into the causes of this perilous and disgraceful state of affairs. Demagogues, professional prophets and viewers-with-alarm seized on the opportunity to beat a renewed roll on their own little drums and recited afresh their pet panaceas for saving America at the expense of American ideals.

Amid all the hubbub, the one thing on which nearly everybody seemed to be agreed was that the fault lay with American education. Statistics of the output of engineers and scientists in the USA and the USSR were bandied about to show where we had failed. Lurid stories were told of the illiteracy of high school graduates in both the sciences and the arts of communication as proof that high school teaching was to blame. Other statistics were cited showing that this great, rich country of ours spends a lower proportion of its national income on education than almost any other advanced country, and a far lower proportion than the Soviet Union.

It was suddenly discovered that the crucial contribution of the teacher to our progress and prosperity is far from being justly recognized, either in material rewards or in social prestige. The pay and prestige of the American professor were contrasted —not always accurately but nevertheless significantly—with those of his counterpart in the Soviet Union. The facts are as stated, but what about the inferences drawn from them? What about the underlying causes? After all, these facts had been public property for years, but when educators and others tried to bring them to the attention of their fellow citizens they did not get much of a hearing.

Until the beeping of Sputnik resounded around the world, the general public did not show much sign of worry about their educational system —except perhaps how much it was costing them. Their conscience did not seem to be touched by the plight of the teacher. The wage earner's average income had risen about three times as fast as the professor's had, but if the professor had any gripe, he could always get out and earn an honest living as a grocery clerk or an automobile salesman. Did not somebody or other say, "Those who can, do; those who can't, teach?"

Schools were patently overcrowded, but the citizens were not always eager to vote a new bond issue for the school district. They took it quite calmly when the U. S. Congress turned down one proposal after another for Federal aid for school construction. But in the lurid light of the first man-made moon, things looked somehow different. The correspondence columns of the press were deluged with demands for action along all sorts of conflicting lines.

Congress was flooded with educational bills embodying a bewildering variety of proposals with little in common but a general tendency to emphasize science and mathematics at the expense of other fields of study. Inevitably, those who look to Washington for the solution of every problem cried out for sweeping programs of Federal aid, while those who are dogmatically opposed to Federal action denounced it in language that might have suggested to a man from Mars that the White House is a worse menace to freedom than the Kremlin.

But as the months passed, the tumult and the shouting died. New "sensations" took over the front pages of the newspapers—rising unemployment and the threat of another major depression; rumors of corruption in high places; threats of renewed trouble in the Middle East; a civil war in Indonesia; a near-revolution in Cuba, and all but insoluble dilemmas in North Africa. Fresh propaganda victories for the Russians.

A few among the hundreds of educational bills began to grind their slow way through the congressional mill, with the minimum of public attention. Meanwhile, the United States finally succeeded in putting a few satellites of its own into orbit. Our national vanity was assuaged and possibly, though not quite so certainly, our international prestige was restored.

Perhaps it had all been a false alarm — there had never been any crisis . . . nothing really to worry about at all, so we can all get on with "business as usual." Where does the truth lie? Man's vision is notoriously distorted by moonlight, and I need not remind you of the connotation of "moonstruck."

Now that the Sputnik-inspired hysteria has abated, it is time for us to take a fresh look in the clear light of day at American education — and its role in our national life. This is something we ought to do in any case from time to time, without the impulsion of a so-called crisis. Higher education is an activity which of its very nature demands constant review and appraisal. The moment it becomes mechanical and repetitive it ceases to be itself.

This critical appraisal is, of course, primarily a task for the professional educator. In a democratic society such as our own, however, it will be little more than an academic exercise unless the people as a whole understand the need for it and can be persuaded to lend their support in translating its results into action. That is why I welcome the shock that the events of last fall gave to our national self-complacency.

It cannot but be good for the American people to be re-awakened to the contribution that higher education makes to our national welfare and indeed to our national survival. Civilized man is prone to take too much for granted the foundations on which his civilization rests. The best of us are blissfully unaware that we depend for our very existence on a complex and delicate mechanism built up by the ingenuity of the past generations and maintained only by the continuous application of effort and intelligence. We are, in fact, living on an accumulation of intellectual capital, and like any prudent businessman, we ought to be constantly adding to and renewing that capital. But Americans are disposed by both political philosophy and technological achievement to assume that something they call "progress"—measured all too often in terms of labor-saving gadgets and canned entertainment—is automatic and inevitable. We needed a forcible reminder that the future of our society depends on the unending pursuit and dissemination of new knowledge, and that, of course, is the essential contribution that colleges and universities make to our whole society.

It is not just a matter of training scientists and engineers, and it would be disastrous if we were to be carried away by that idea. Of course we need more scientists and engineers just as we need more well-trained and well-educated men and women in every professional field to meet the demands of our national growth.

But our most pressing problems are not scientific or technical but moral and psychological. The clamor for concentrating our educational resources on the production of scientists and engineers is itself a symptom of the very weakness that landed us in our present position.

This is not essentially a weakness in our educational system but a flaw in our national system of values. Our whole history has tended to predispose us toward pragmatic values. Our long and arduous struggle to tame and exploit a vast, virgin continent has placed a premium on doing rather than on thinking. For Americans, achievement means predominantly physical achievement, measured in tons or cubic yards or miles per hour or in the dollars and cents into which physical achievement is readily translated.

The Frontier left little time or energy for study and reflection, for artistic creation or mystical contemplation. Psychologically, the Frontier is still with us. We profess to value these things, but when the chips are down we do not admire them as we admire successful action. Traditionally, Americans worship education, but they do not value it for its intrinsic worth. We may respect a Ph.D. for its income-producing possibilities, but we do not respect the scholarship it is supposed to represent.

We do not value intelligence as such or knowledge for its own sake. Knowledge is desired for the material benefits it will produce. What we seek is "know-how"— we do not bother about "know-why." While Americans have for several generations been pre-eminent in technology, in the ingenious application of existing knowledge to practical ends, we have never been outstanding in the discovery of new knowledge.

Nearly all of the really fundamental scientific discoveries have been the work of non-Americans or of Americans by adoption who were born and educated in other countries. I need hardly dwell on our relative poverty in front-rank thinkers in non-scientific fields. This is America's number-one problem. It would be a life-or-death matter if Communism had never been invented.

No amount of technical ingenuity is a substitute for creative thinking about the physical world, about human relationships and about the ultimate realities. It is not a question of educational methods—and it is not to be solved by crash programs. For it involves nothing less than a radical amendment of our national system of values. We cannot just leave it to the teachers. The issue has to be faced by you and me. We cannot just buy a solution with money. Of course we must devote a larger share of our national wealth to education. This does not merely involve an abstraction called "national per capita income." It means that you and I must be prepared to pay more in taxes and give more in voluntary contributions to support our schools and colleges and to pay our teachers decent salaries—even if it means giving up the country club, a second car or color TV.

But it means much more than that. It means that we ourselves must learn to respect scholarship and teaching. We must get over our distrust of the egghead and recognize him for what he is—the most valuable member of the community—the man to whom above all others we owe our national security and our vaunted standard of living. We must defend in the face of misrepresentation and abuse his unfettered freedom to discover and teach the truth, not in his personal interest but in the interest of us all.

We must teach our children, by precept and example, to put first things first: physics before football, history before hot-rodding, principle before popularity, decency before dollars.

If we as citizens accept our responsibilities, we must be assured that the

(*Continued on page 22*)

DETECTION

LMED'S airborne **GENDARME** will illuminate the unknown

One or many, in clouds or clutter . . . nothing will elude GENDARME, LMED'S new *Airborne Early Warning and Control radar. New AMTI (Airborne Moving Target Indication) and Pulse Compression techniques sharply curtail sea clutter, improve target detection. New "built-in" height finding provides a truly 3-D search system. New data processing methods insure completely automatic operation. For further news on LMED's detection developments write for brochure: "Airborne Detection . . . in Search of Time," **Dept. 7S.**

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LIGHT MILITARY ELECTRONICS DEPARTMENT
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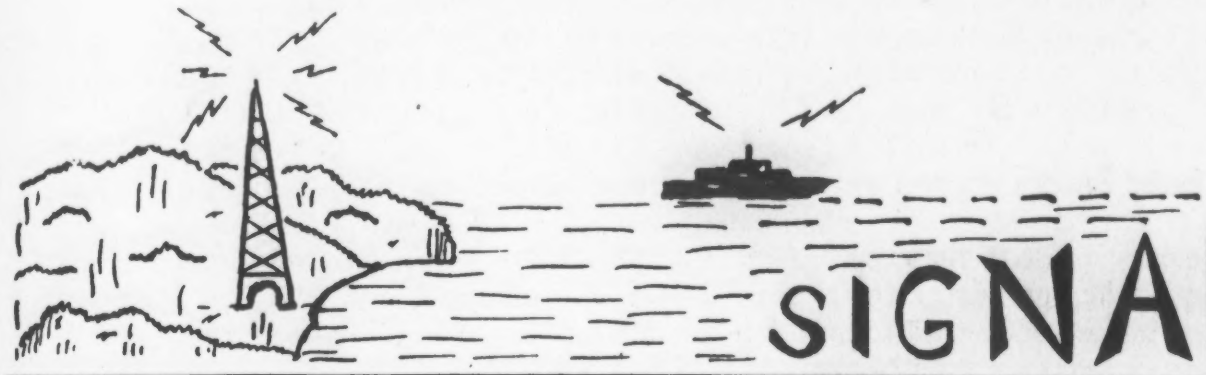
A DEPARTMENT IN THE DEFENSE ELECTRONICS DIVISION



SIGNAL·GRAM

— GOVERNMENT —

ROCKET MAIL FLIGHT Six letter-carrying rockets will flash across the Nevada-California border on December 31st to commemorate the end of the International Geophysical Year. The fourteen-foot long by three-inch diameter rockets will carry six-thousand special rocket envelopes from stamp collectors and will be launched by the Rocket Research Institute from Clark County, Nev., to Nipton, Calif., 2 miles away.

ARMY CLOSED-CIRCUIT TV Telecasting of a 2-hour course in guided missiles has been inaugurated from the U. S. Army Ordnance Guided Missile School at the Redstone Arsenal at Huntsville, Ala., to the U. S. Armor School at Fort Knox, Ky. Through the medium of closed-circuit TV to instruct in missiles, which is the outgrowth of more than 7 years study by the Army Signal Corps and other military agencies, costly equipment and skilled instructors are presently available at the Missile School for instruction anywhere in the U. S. The purpose of the course is to train high-ranking officers in the methods of inspecting missiles at sites throughout the world to insure that the weapons are being kept in instant combat readiness.

FCC LICENSE FOR SPACE CONTACT Press Wireless, Inc., N. Y., has asked the FCC for official confirmation of its understanding that it has authority under its present license to provide communications to outer space on other planets. In view of recent advances in space technology and the imminent placing of man on the moon, Press Wireless "wishes to provide an informational communications service with manned satellites, space platforms, or space expeditions." The FCC replied that it will have to see Press Wireless' communication plans before issuing any licenses.

CONTRACTS: ARMY: Tele-Dynamics, Inc., design, manufacture and installation of radio telemetry equipment for flight testing of surveillance drones, $320,000; Telecomputing Corp., nuclear warhead test equipment, $1,510,637; Chrysler Corp., engineering services on the JUPITER missile, $7,000,000; The Martin Co., PERSHING missile weapons system, $8,734,086. NAVY: Lockheed Aircraft Corp., pre-production engineering work on the P3V-1 ELECTRA anti-submarine warfare patrol plane, over $10,000,000; Ryan Aeronautical Co., production of automatic radar navigation equipment for Navy aircraft, over $20,000,000; The Applied Science Corp., mobile van to receive telemetered information, $250,000; General Precision Laboratory, Inc., television equipment, undisclosed amount—believed to be the largest contract ever awarded by the Department of Defense. AIR FORCE: Radio Corp. of America, development of high-temperature devices employing new semiconductor materials such as gallium arsenide and indium phosphide, $3,000,000; Sperry Gyroscope Co., AN/TWP-1, microwave command guidance equipment, range and tracking test sets, radar sets, services and data in development of XQ-4A drone, $1,340,000; Laboratory for Electronics, Inc., doppler-radar sets and equipment, $18,000,000; Hughes Aircraft Co., production of aircraft and weapons control systems for the F-106 all-weather jet interceptor, $16,238,469.

— INDUSTRY —

WORLD-WIDE COMMUNICATION SYSTEM International Telephone and Telegraph Corp. has been selected by the Air Force as prime contractor for a world-wide control system for the Strategic Air Command. This automated electronic system is designed to transmit, process and display information required by the commander in chief, SAC, and his staff, in the planning, direction and control of the global peacetime and wartime operation of SAC. The estimated contracts for the system, which consist of communications, data-processing and data-presentation subsystems, will be in excess of $150 million over the next 3 years. To manage production of this system for SAC, ITT has established a new unit called International Electric Corp. which is to have its headquarters at Paramus, New Jersey.

MOBILE PHONE SYSTEM Lenkurt Electric Company has entered the commercial mobile communications field by marketing a "newly designed mobile telephone system that is fully compatible with existing nation-wide mobile telephone service." Called "Mobiltel-Manual," the first product of the new non-military line, was developed jointly by Lenkurt, San Carlos, Calif., and Automatic Electric Co., Chicago, Ill., and is said to be the first mobile system for telephone companies in one package.

PHILCO AIR RADAR A new air-borne radar system said to produce clear, detailed maps from behind a cover of clouds, fog or darkness has been developed by Philco Corp., Philadelphia, Pa. Claimed to be compact enough to be used in most operational aircraft, the lightweight radar system utilizes a new signal processing technique known as REDAP. Philco has received a $2.5 million contract to build 8 of these new high resolution systems for the U. S. Army Signal Supply Agency. This all-weather radar equipment will be used in advanced drone reconnaissance aircraft.

NEW RCA DEPARTMENT RCA has added another new department to its large Defense Electronics Products Division with the dedication of its Missile Electronics and Controls Department in Burlington, Mass. This new Department is active in the NIKE-ZEUS program and will be an integrated operation for the research, development and manufacturing of missile and electronic control systems. The former Boston Airborne Systems Laboratory of RCA has become a part of the new department.

"WORLD'S LARGEST TRANSISTOR" EXHIBIT Featured in the Texas Instruments exhibit in the Exhibit Hall of the New York Stock Exchange is the "world's largest transistor" working demonstrator—depicting the principal effects that occur within this solid-state amplifier. The Texas Instruments exhibit also illustrates the company's activities in geophysical exploration, industrial instrumentation, military electronics apparatus and electronic components. All visitors are audibly greeted and counted by a phototransistor-actuated mechanism. The Stock Exchange Exhibit hall is open from 10 a.m. to 3 p.m., Monday through Friday. The entrance is at 20 Broad Street.

— GENERAL —

"GATEWAYS TO THE MIND," latest of the Bell System Science Series programs, presents not five, but at least fourteen human senses at work. The film shows that the human senses are the means through which man maintains his contact with the world about him. This 1-hour show was telecasted over NBC network in October and is available on 16-mm color film to schools and other interested groups from Bell Telephone Companies.

MAP OF THE MOON Rand McNally & Company, a pioneer in mapping the earth's surface, has recently published an interesting map of the moon. This large map, which is based on photographs to assure complete accuracy, gives a comprehensive picture of the moon's surface as seen from the earth, showing and naming all important craters, mountains, oceans and valleys. It also contains full-color drawings of the JUPITER and VANGUARD rockets and the first American satellites. On the reverse side, is a map of the planets, showing their size and distance relationships and other information. This new map is 46½" x 26" in size, and folds to 6½" x 10½". It is available in book and department stores and sells for $1.00.

NAVIGATING WITH JELLYFISH North Pole jellyfish were a navigational aid when the USS SKATE traversed under the top of the world. The SKATE's captain, Cmdr. James F. Calvert, revealed that when he poked the sub's periscope above the surface, he was surprised to see that the water was full of jellyfish. When surfacing in the Polar regions, it is imperative that a sub be brought to a precise stop to avoid collision with the edge of the ice lake or within small bergs. The jellyfish proved very useful in this respect. When the jellyfish were motionless in relation to the sub, it meant that the ship was at a dead stop, without any set or drift, and was able to bob to the surface in perfect safety.

CALENDAR OF EVENTS:

DECEMBER 9-11: The Mid-America Electronics Conference has been scheduled in the Municipal Auditorium in Kansas City, Missouri. Fifteen technical papers and approximately 100 exhibits will be presented. Sponsored by the Kansas City section of IRE.

DECEMBER 26-31: The American Association for the Advancement of Science will have their annual meeting in Washington, D. C., presenting news about recent advances in scientic research and development in all branches of science, at the Sheraton-Park Hotel.

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Crisis and Challenge

(*Continued from page* 17)

teachers will do their part. They have a hard row to hoe in training future generations of Americans who will respect intelligence, will value knowledge for its own sake and will be prepared to undergo rigorous intellectual discipline in order to develop their talents for the service of their country and the world. It is an impossible task if the whole weight of social values is against them, but not if they have our whole-hearted and tireless support. After all, they would not have become teachers at all if they had not sought rewards other than dollars and cents and more material comforts. The rewards of the academic vocation are quite different from these things, and they are unparalleled in any other career. As Henry Adams said, "A teacher affects eternity: he can never tell where his influence will stop." He may have the supreme satisfaction of finding that he struck the first spark of intellectual curiosity in another Fermi or Rutherford, an Albert Schweitzer or an Eve Curie.

In any case he will mold the minds and hearts of hundreds of other men and women who will never be great scholars, inventors, artists or teachers but will have the imagination and sensibility to recognize and follow great leadership.

Luthers and Loyolas, Lincolns and Lavoisiers will always be few and far between, but society will always have need of a far greater number of men and women of lesser stature through whom the influence of the rare genius will be spread through the mass of ordinary people.

These lesser leaders, some of whom the influence of the rare genius will be spread through the mass of ordinary people.

These lesser leaders, some of whom are graduating every year, may become scientists or engineers — they may be doctors or lawyers, teachers or preachers, housewives or businessmen. But what they will all have in common will be a capacity to distinguish ends from mere means and to set their professional activities, whatever they may be, in the context of social responsibility. Of their own notion or under the inspiration of greater men and women, they will enrich every aspect of our national life by subjecting it to continuous, sympathetic criticisms aimed at ever more effective realization of our highest ideals. They will make the difference between a herd of gadget-wielding automatons and a growing, creative society. To produce such men and women is a high calling and a heavy responsibility.

Even when teachers receive material rewards more nearly in proportion to their social value—and I believe we are already seeing the beginnings of an overdue movement in that direction—teaching will still be a career that demands an exceptionally strong sense of vocation and an unusually high measure of devotion. The love of truth can be inspired only by those who love truth. Civic virtue can be taught only by those exemplifying it.

The teacher is entitled to his private life and his personal opinions just as much as any other citizen in a free society, but he can never escape the expectation that he shall be an example to others. But if the teacher has special obligations, second only to him comes the graduate. In the words of a distinguished college president and public servant, "To do with a will that which contributes to the solution of the manifold problems of our complex society is the responsibility of the privileged group attending our institutions of higher learning."

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TV in Military Education

(*Continued from page* 9)

beams and ceiling. A total of seventy outlets are available, distributed to furnish adequate set lighting in any area of the studio. Each outlet is individually terminated in a jack panel from which any combination of fourteen lights can be connected to dimmer units.

Studio B

In addition to the main studio is an auxiliary studio with 600 square feet of floor space and 9½ feet of overhead clearance. This studio is equipped with three cameras of the same types installed in the main studio.

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An additional vidicon camera is being procured for experimental use. It is the sub-miniature version carrying the trade name RCA "Telemite." Claimed by the manufacturer to be the smallest and lightest television camera in existence, its dimensions are 1⅞ x 2⅜ x 4¾ inches and it weighs approximately one pound. The "Telemite" uses a ½-inch vidicon pick-up tube and claims good contrast with scene illumination of ten-foot candles or less.

Classrooms located in the immediate area of the television studios are served by a closed-circuit underground coaxial cable system. Present facilities provide for three simultaneous telecasts over the cable system.

Courses of one academic division, located approximately two miles away, receive television service by means of a microwave channel. Signals are retransmitted from the microwave terminal to classrooms by coaxial cable.

Special programs may be viewed by capacity audiences of approximately one-thousand persons in a post theater. Permanently installed here is a PT100 large screen projector capable of producing a 15 x 20-foot image. Effective use is made of this facility during ROTC and Reserve Summer Training Camps and on other special occasions.

A GP-611 portable large screen projector capable of projected images to 7½ x 10 feet is normally installed in the auditorium of the Signal Corps Demonstration Building. The image from the GP-611 is projected through a frosted glass screen to audiences of up to 300 persons. The projector is easily transported and installed in any location desired.

A complete overhead cable system capable of five simultaneous telecasts has been engineered to replace the present underground cable and microwave system.

Film Studio

Projection of kinescope recordings and training films to classrooms is accomplished by means of two TK21 vidicon cameras mounted on TP16 television film projectors. In these two chains, video information is projected directly onto the lens of the camera. An additional chain will be combined with a TP-11 multiplexer and TP-3B slide projector to provide versatility both in telecasts and kinescope production. Procurement of a fourth film chain is planned to meet the 100-hours-per-week program projected for FY 1959.

With two modern studios producing kinescope recordings or live programs and four channels available for film projection, the accomplishment of the projected program for FY 1959 is virtually assured and a major contribution to development of television in military education can be expected from the Army's Southeastern Signal School at Fort Gordon.

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FREQUENCY DENSITY

what the USAF is doing about it

IT WAS TWO O'CLOCK IN the morning. All communcations circuits were in and working. The communications duty officer in the headquarters of one of our numbered Air Forces was just settling down to some serious reading, hoping that the remainder of his tour of duty would be quiet and uneventful.

Suddenly the stillness of the room was shattered by the short, loud rings of the telephone.

"Sir, I have a frequency block on 'Echo Three'—can you give me a new frequency?"

"Echo Three" was one of the radio links in the radio relay system serving the numbered Air Force.

"Echo Three?—Okay, hold on a minute—I'll see what I can do for you," replied the sleepy voice of the duty officer as he laid down the telephone receiver and reached for his frequency complement charts.

After studying the charts, he picked up the receiver, and said "Okay Barnes, try 232.5. It should work. If it doesn't, call me right back."

"Okay sir, I'll give it a try," replied the distant voice in the receiver.

The episode just described goes on day after day in the frequency management activities of the Air Force. As related here, many times radio frequency interference problems can be solved by merely changing frequencies. Too often, however, they can not be solved in this manner and important circuits are inoperative for long periods because of interference.

The interference problem, thus far discussed, is not only true in radio communications circuits; radar systems, telemetering circuits and guidance systems are similarly affected. In these areas, the problems become even more critical because they cannot be solved by merely changing frequencies. For instance, we all know how difficult it is to change radar operating frequencies, and the preset frequencies of our telemetering systems. Radio interference, therefore, is a serious problem of constant concern to the Air Force.

In recognizing the problem of radio interference, the Air Force is taking positive action to cope with it. Those responsible for frequency allocation and assignment within the Air Force (The Frequency Allocation Group of the Directorate of Communications-Electronics) are engaged in a continuous campaign to keep radio interference to a minimum. The word "interference" is used here in its broadest sense, embracing the impact, real or potential, of Air Force operations not only on itself but upon other users of the spectrum as well. All requests for frequency assignments are critically reviewed from the standpoint of factors which contribute to interference and frequency incompatibility. First, and perhaps most importantly, the basic requirement for a frequency is carefully examined. Can the operational requirement be satisfied by any means other than through the use of a radio frequency? A by-product of this first screening process, is, of course, spectrum conservation. Next the megacycle order of the frequency requested is reviewed in the light of current uses of the spectrum, tables of frequency allocation and propagational considerations. Finally, technical characteristics such as, power, emission, bandwidth, tolerance, tuning capability, etc., are examined and are compared with capabilities within the state of the art in order to satisfy the requirement with a minimum of impact on the spectrum as a whole. Following the internal processes just described, a coordination cycle is then set in motion. The Army and the Navy, and where applicable, other governmental or non-governmental departments and agencies are contacted. Additionally, where necessary, foreign governments or administrations are approached through a variety of coordinating mechanisms. Although the preceding largely deals with operational requirements, by and large the same procedures are followed with respect to requirements for frequencies for experimental and developmental purposes. As may be readily understood keeping radio interference to a minimum is a complex, arduous and full time job.

In view of the seriousness of the frequency density problem, the Director of Communications-Electronics, USAF, decided that the frequency management effort would be increased by the establishment of an agency which could coordinate the activities of all Air Staff agencies which have anything to do with the frequency density problem. As a result, the USAF Frequency Density Group (FDG) was organized in November 1955. This group coordinates the activities of Air Force Frequency Allocation and assignment experts, Air Staff Planners, operational personnel, radar experts, research and development personnel, maintenance experts, development planning personnel, operational analysis personnel, as well as representatives from the Assistant Chief of Staff for Guided Missiles. In addition any member of the Air Staff who has a bonafide interest (or problem) in the frequency density field has a standing invitation to attend FDG meetings.

Following the organization of the FDG, it was recognized that one of the first actions should be to inform the Major Air Commands of the seriousness of the frequency density problem, and to give them guidance in its resolution. As a result, USAF Plan "RED ROCK" was developed. This plan outlines specific responsi-

by Lt. Col. Robert J. Shafer, USAF
Policy Officer, Policy Group
Directorate of Communications-Electronics

bilities for each command in tackling and alleviating the interference problem. Such actions include: (1) Establishment of frequency coordination boards, including coordination with the other services. (2) Development and publication of engineering installation standards and practices which will provide measurement techniques to determine the suitability of an area in terms of ambient noise and radio interference levels. (3) Identification and correction of frequency incompatibility in existing communications-electronics installations. (4) Establishment of time sharing techniques wherever possible. (5) Reduction of electromagnetic emission by limiting power output wherever possible. (6) Monitoring of USAF frequencies to reduce off frequency operation, misuse of frequency assignments, and excessive simultaneous transmission. (7) Provision for more comprehensive training programs, involving reduction of frequency incompatibility, conducted by the Air Training Command and the Air University.

In addition to actions being taken by the Major Air Commands under USAF Plan "RED ROCK," the FDG, itself, is constantly investigating actions which will reduce the frequency incompatibility problem. For instance, when it was observed that development plans did not include sufficient information involving frequency utilization, the FDG requested the Director of Research and Development, USAF, to investigate this and have the Air Research and Development Command (ARDC) take appropriate action. As a result ARDC amended its directive concerning development plans to include the necessary frequency information. When a recent USAF study indicated future problems, involving frequency incompatibility which could be expected in an overseas area, the FDG directed that special tests be made to determine what the nature of the problems would be. As a result of the tests the Air Force was able to make pertinent decisions involving the use of a certain weapons system. When a civilian research company recently uncovered frequency incompatibility problems in the field, which could be corrected by the commands concerned, the FDG issued an "All Major Command" directive pointing out these problems and directing that action be taken to correct them. When the FDG learns of new techniques which might reduce the effects of frequency incompatibility, appropriate action is taken. For instance, a recent memorandum by the FDG to the Director of Development Planning recommended that an investigation be conducted to determine what actions are being taken to develop communications equipment for more economical use of the frequency spectrum.

With the creation of the FDG, a common meeting ground has been established where all cognizant Air Staff agencies can consider the frequency incompatibility problem. Because of this, all such agencies are developing a greater appreciation for the seriousness of the problem. In addition, the FDG has invited the USAF members of the Joint Spectrum Evaluation Group (JSEG) to sit in on FDG meetings so that the FDG will have an opportunity to learn what is being done by other services. By the nature of its mission, the JSEG is able to inform the FDG as to what action is being taken within other Services and by industry to alleviate the frequency incompatibility problem.

But, in spite of the many positive actions being taken by the Air Force to cope with the frequency density problem, the Air Force still experiences problems which are difficult to resolve. For instance, equipment is still being developed which radiates spurious and unwanted signals. It is in this area that considerable assistance could given to the Air Force in its effort to reduce frequency incompatibility and conserve valuable radio spectrum race. Such assistance should consist of equipment suppliers devoting more time and attention to design of equipment and components. In so doing, it is believed that improved frequency stability, reduction of spurious emissions and reduction of receiver band-pass acceptance will be achieved.

The USAF still has a long way to go before the frequency incompatibility problem is solved. As pointed out, frequency management personnel are attacking the problem daily, and the FDG is doing much to coordinate the activities of all agencies concerned with the problem. Through the efforts of the JSEG, industry is beginning to take a greater interest in the matter. Probably one of the greatest headaches, is the limited number of frequencies available to meet all of our requirements. Even though we solve the interference and management problems, we still have an inadequate number of frequencies to go around. At present, this remains an unsolved problem.

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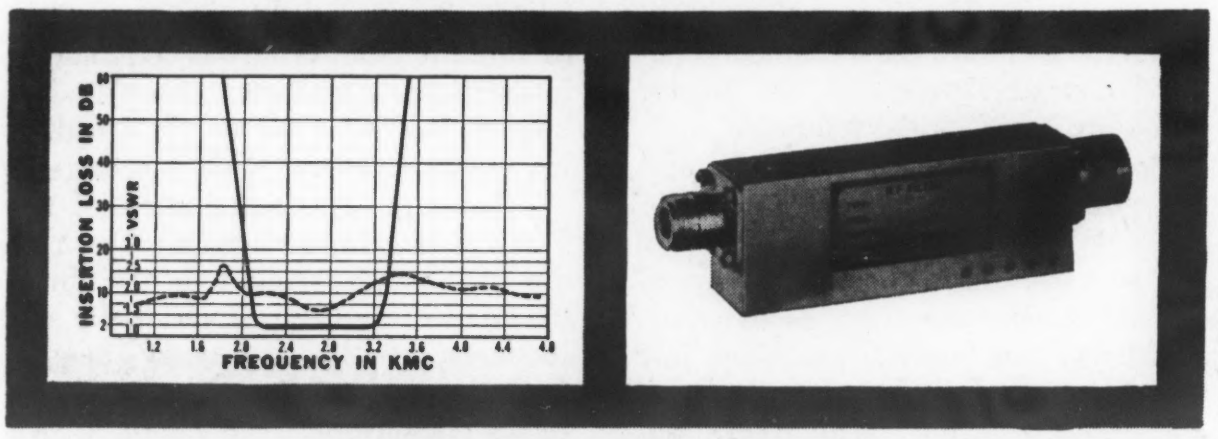

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The Radio Amateur

(*Continued from page* 13)

in general and to the Air Force in particular, rendered by our nation's hams. Like all citizens we share in the nation's gratitude to all amateur radio operators who have provided distaster communications during times of national emergency. The record of achievement compiled by amateur radio during flood, hurricane and tornado emergencies will forever place the military and civilian public in their debt.

As defense planners, we are particularly gratified that amateur radio on its own initiative, has done so much to provide a civilian defense communications service.

The record of military service of radio hams in World Wars I and II is even more evident today. I am happy to say that the evidences of skill, resourcefulness and general communications know-how typified by a ham ticket of two decades ago is also true today and radio amateurs seeking a career in the jet age Air Force are as welcome as their 1917 and 1940 counterparts.

The amateur trained technician of World War II continues to assist the military with his hobby and today, thanks to amateur radio, the national comunications and technical potential has increased a thousandfold and amateur radio operators are considered a part of our national defense stockpile.

The amateur record for handling distress, morale and emergency traffic is, of course, well known to all. But no more enthusiastic booster for ham radio exists than the harried Air Force commander at some isolated outpost in the far north who is able to keep the men of his organization close to their loved ones at home—thanks to the services of those dedicated hams back in the States who devote their free time to keeping our servicemen in touch with their families. If the reader has seen the faces of youngsters lined up outside the ham shack, four months after the last winter mail, waiting anxiously hour after hour for a phone patch home, you know the depth of gratitude that your Air Force holds for amateur radio.

Needless to say, amateur generosity to the military is not restricted to the Air Force as the men of the Navy Antarctic expeditions and the Army's overseas commands can attest.

Amateur radio operators are by tradition generous with their skill and time. The Air Force recognizes the tremendous pool of technical knowledge made available to us through amateur radio. We are justly proud of our air-to-ground single sideband program now operational in the Strategic Air Command. Thanks to the skill and cooperation of competent amateurs, who have followed our world-wide test flights, highly valuable data from amateurs all over the country allowed a complete flying test program to be completed in record time.

The Military Affiliate Radio System staffed and manned one-hundred percent by radio amateurs is a high point in the cordial cooperative relationship that exists between the Air Force and the radio amateur. The Air Force Mars Program has compiled a superb record of achievement and communicators in the active Air Force are proud of the amateur Air Force partnership in the Mars Program.

Amateur operation is of vital interest to the Air Force. We feel that organized participation in all of these various amateur-military projects is a high point in patriotic endeavor.

The future ahead for amateur radio is as limitless as the space age to come. I urge all hams to continue to pursue new developments in the communications art. Lend a helping hand to the newcomers and actively encourage the development of new techniques. In short, continue to be dedicated radio amateurs.

In conclusion, I wish to commend each and every amateur radio operator for his dedication to the art.

As an amateur, I am proud to be numbered among the hams.

As a military man, I salute all of them for their wonderful contributions to the national defense effort.

As an American, I am deeply grateful for the countless services to our nation's welfare and I join with Americans everywhere in thanking God for the American radio amateur—"The Nation's Secret Weapon."

PART TWO

SYNOPSIS—PART I

With the ever-increasing use of electronics in military fields, the need for airmen with a well-grounded knowledge of the fundamentals of electronics was stressed by Colonel Wells in Part I which appeared in the November issue of SIGNAL. *The Air Force, recognizing this and the various problems involved, has devised a new training school method, based on developing individual potential and the particular level of knowledge required for the duties of each airman.*

A NEW APPROACH TO ELECTRONIC TRAINING

by Col. B. H. Wells, USAF
Chief, Communications Branch
United States Forces, Japan

NOW LET US FOLLOW the fortunes of a particular airman through the course which was outlined in Part I (Nov. '58 issue of SIGNAL). Upon reporting, the student is interviewed by the Training Officer and is told exactly why he is entering the course. The advantage of a strong fundamental knowledge of electronics for advancement in his military career field is explained, as well as the future value of this knowledge, should he choose to return to civilian life. The setudent is told that there is no stigma attached to the fact that he may not be able to understand the theory of electronics or master the fundamentals of his career field. He is told how the school will determine whether or not he is in the correct career field and if not, why it will benefit both him and the Air Force to be placed in a field commensurate with his abilities. During the interview, promotions and pay increases are stressed along with the increased self-esteem and confidence which comes with thorough knowledge of the equipment with which he will be required to work. He is told that a comparable correspondence course in civilian life would cost at least $250 excluding the tutors and the amount of laboratory facilities that our school had to offer. He is given all of the rules of the school and told that the course will not exempt him from any detail type of duty, will allow him to take furloughs if necessary, will only keep him from his organization for a half day, but, that consideration for promotion will be withheld until he has completed or "phased out" of the course of instruction. This interview is designed for one purpose—student motivation.

After the interview, the student is given an entrance examination to place him at a grade and phase level comparable with his knowledge level. In the case of the particular student, whose fortunes we are following, the knowledge level is so low that he is started at phase 1 of grade 1. This is true of a great majority of the students entering the course so our man has lots of company.

He then reports to his instructor and is provided with the required text material for phase 1 of grade 1, a work sheet covering the text material and an outline covering the laboratory experiments. The student studies the text material, consults the instructor when he meets with problems he does not understand and completes his work sheet. The instructor corrects the work sheet in the presence of the student, explains any errors found and returns it to him for correction. When the instructor decides that our student has completed satisfactorily his phase work, he is given a slip which he takes to the laboratory supervisor who issues him the necessary materials to perform his experiment and checks his completed work. Upon satisfactory completion, the student reports to the examiner for his phase examination, and, if he passes, he is given a phase completion certificate and proceeds to draw the materials for the next phase. If he scores less than 90% on the examination, the examiner calls in the student's instructor for consultation and examination of the questions missed. The instructor consults with the student to determine if he knew the answers and was careless, was confused by the question, or if he made an error in computation. The instructor can authorize the student's advancement in spite of the failure if he believes that the student really knows the material. However, if the student does not "know his stuff" he is directed to repeat the course. If he fails the second time, the student is interviewed by a school board to determine whether he should be retained in school or "phased out." If the student "phases out," his school training records are forwarded to his unit training section, his squadron commander and to the group commander with a complete summary of the situation and recommendations for possible reclassification to a career field more suited to his abilities. The individual's desires as to a career in which he could become competent are given due regard in consideration with Air Force career field manning.

Upon completion of the entire course the student is given a certificate indicating that he has completed a comprehensive course in electronic fundamentals. If he "phases-out" before completing the entire course, he is given a certificate which indicates the general subjects in which he has demonstrated proficiency.

After the outlined course had been in operation for a few months many added "pay-offs" became evident. Some of these benefits had been anticipated but many of them appeared as a result of experience. Screening and testing of personnel revealed that some airmen. who were trained and classified in one

of the less technical fields, such as telephone operator, possessed the ability and aptitude necessary to comprehend the technical substance of basic electronic theory. This being true, such individuals, given an oppportunity, were able to cross-train and qualify for reclassification into the more technical fields of radio and radar. This was a direct gain to the Air Force for, had they not had the school, the men would have remained in their old career fields. We also found that school graduates were making much higher grades on their upgrading examinations than other airmen who had not had the course.

This unique course differs from the requirements of a conventional type course. In the first place, there are no set school terms or periods. Airmen may enter the course at any time and are never held back because they are behind a class. They may progress through the course exactly as if it had begun upon their arrival. In essence, the course did not start anew each time a new student entered, because each student was a class in himself. He taught himself, governed his own rate of progress, and determined primarily, whether he succeeded or failed.

Training requirements such as books, laboratory space and supplies, and even instructors needed for this type of training are considerably less compared with the requirements needed for a conventional type of school course. Less books and materials are needed because the students are "scattered," and are not progressing as a group. They progress as individuals and as each individual completes a phase, his books and materials become available to another student. The same holds true for the laboratory equipment. The student does his own work and he does it by himself. There is no such thing as a laboratory class. It is an individual laboratory. As a result, fewer pieces of equipment are needed for a definite number of students. The number of instructors are less because the student is, in reality, his own instructor and one school instructor can "double in brass" in two or more phases. The school instructor is there to assist and tutor the student. The instructors themselves have indicated that the course is wonderful training for them because rather than having to learn the text material for one or more presentations a day, they have to be ready to answer student questions in all of the wide field of electronics rather than upon a limited presentation.

The most that a student can do in a conventional school is to study ahead of his class and then he must wait upon the class examination for proof of completion of a particular course. The student in a progressive situation is not limited by class hours. If he desires, he can complete his work sheets at night or in his off duty time and can take the test the next day in school. However, it should be pointed out that the aim of this type of course is not to speed students through a given course of study, although this is a result with certain airmen. It is realized that speed of completion is not necessarily a yardstick in measuring a man's ability to assimilate knowledge. Many times the slower student is more thorough and as a result accomplishes more in the final analysis. This type of training course compensates for the above fact. Absence from school for duty or emergency is no deterrent to obtaining knowledge, it merely delays school completion.

Individual incentive is enhanced by such a training course because it gives the individual a chance to express himself and "show what he's got." Reticent students are much more inclined to ask questions from a tutor rather than display ignorance of a subject in front of a class.

Examinations are easier to control for the students are not functioning "en masse," but are staggered in such a manner that a relatively small number will be taking examinations at the same time. It is possible to grade papers more objectively because the grader is not handling a large "pile" of examination papers nor is he working against time.

We of the 12th Communications Group have been particularly pleased with the results of our Electronic Fundamentals School. To date, 582 students have been enrolled in the course. These enrollees possessed almost all of the skills found in a Communications Group to include telephone operators and engine mechanics. Of this total, 182 have graduated. 242 airmen have been "phased out" and were either returned to duty in their career fields with a better understanding of the fundamentals, or reclassified and placed in jobs more adaptable to their level of understanding. Several telephone operators, linemen and powermen have been converted into radio mechanics. The remainder of the students were lost by transfer or discharge before completing the school.

The gratifying aspects of our work have been two-fold: first, we have elevated to desired standards the theoretical electronics knowledge of over 350 airmen; second, we have offered the students an opportunity to adjust and personally find a more compatible career specialty related to their basic knowledge of their jobs.

Since military inactivation orders caused discontinuance of this course, it is our thought to pass on the benefit of our experience in the field of electronic training which may assist other organizations large enough to undertake a school of this type. It appears that such a school would be particularly adaptable to the Training Command on an Air Force-wide basis. The course could be a prerequisite for entry to more advanced courses in the communications-electronics field and would have the following beneficial results: first, it would shorten the advanced courses because they would not have to teach fundamentals; second, it would insure that all entrants to advanced courses would be well grounded in fundamentals and give all the students in advanced courses a common level of understanding; third, it would insure that all course entrants would be thoroughly capable, both in mental aptitude and desire, to grasp the material that will be presented in advanced training; fourth, it would eliminate most of the failures in advanced training and make better use of instructors and classroom facilities; fifth, it would quickly weed out the inept and allow more immediate assignment to jobs befitting their capabilities; sixth, it would allow for continuous input into the basic course and eliminate time lost awaiting course commencement; last, if Training Command facilities for advanced courses were saturated, it would allow direct assignment to duty of personnel equipped to rapidly acquire knowledge through unit on-the-job training.

Let us expand. Suppose that 1,000 men who had just enlisted and completed basic training, with electronic knowledge indexes of five or above, were enrolled in a fundamentals course such as we have outlined. Our experience shows that one-fifth of these individuals will have limited ability or desire and will absorb only enough knowledge to be a lineman or less. These 200 would immediately "phase out" at the end of or during the first grade. Those that "phase out" during this grade would immediately be assigned to career fields not requiring a knowledge of electronics. Those that passed the first grade, only, would be assigned to a lineman's course or sent to units requiring linemen for on-the-job training. In the event that this number exceeded Air Force requirements for linemen, only the best would be selected for further jobs at linemen and the balance could also be changed to other career fields. The input of the course could easily be governed to provide the scarcest field with an adequate number of personnel qualified to train in that field and then the balance of Air Force needs could be filled from "phase outs" or less apt individuals. There would be no harm in filling the carrier mechanic career field with airmen who have enough basic knowledge to be radio or radar mechanics. It would prevent what is happening at the present time —the assignment of individuals to career fields who do not have the desire or the ability to progress in that field.

This article is not presented as a criticism of the training now underway in the Training Command. The writer has been in the Training Command and is aware of some of the various difficulties and deficiencies which beset the path of Air Force educators. It is submitted, rather, as a constructive suggestion, based on experience, of how the Air Force might make better use of the material provided it to increase knowledge in what is becoming one of the most important career fields in this missile age—electronics.

ANNOUNCING TW

SPACE TECHNOLOGY LABORATORIES, INC.

Space Technology Laboratories, Inc., previously a division of The Ramo-Wooldridge Corporation, became a separate company on October 31, 1958. Space Technology Laboratories will be directed by Lieut. Gen. James H. Doolittle, Chairman of the Board (after January 1, 1959); Dr. Louis G. Dunn, President; and Dr. Ruben F. Mettler, Executive Vice President. The other members of the Board of Directors are Robert F. Bacher, Head of the Division of Physics, Mathematics and Astronomy at the California Institute of Technology; James T. Brown, Vice President of the Mellon National Bank, Pittsburgh, Pennsylvania; and Samuel E. Gates, Attorney with the New York firm of Debevoise, Plimpton and McLean.

Space Technology Laboratories has the largest professional scientific and engineering staff in the nation devoted exclusively to Ballistic Missile and Space programs. STL is responsible for the systems engineering and technical direction of the Air Force THOR, ATLAS, TITAN, and MINUTEMAN ballistic missile programs. While it does not engage in production, STL performs experimental and analytical research projects in advanced space technology, including the fabrication and assembly of special equipment and the conduct of test programs. A recent example is the lunar probe project assigned to STL by the Air Force and the National Aeronautics and Space Administration.

Space Technology Laboratories, Inc., plans to maintain a combination of technical competence and organizational strength appropriate to its special and continuing role in the important national program of space weapons development.

SPACE TECHNOLOGY LABORATORIES, INC.

5730 Arbor Vitae Street
Los Angeles 45, California

Thompson Ramo Wooldridge Inc.

On October 31, 1958, **Thompson Ramo Wooldridge Inc.** was formed by the merger of *Thompson Products, Inc.,* and *The Ramo-Wooldridge Corporation.*

Thompson Ramo Wooldridge will be directed by J. D. Wright, Chairman of the Board; Dean E. Wooldridge, President; Simon Ramo, Executive Vice President; and F. C. Crawford, Chairman of the Executive Committee. The other members of the Board of Directors are B. W. Chidlaw, A. T. Colwell, J. H. Coolidge, H. L. George, R. P. Johnson, and H. A. Shepard. Each is a Vice President of the merged company.

Thompson Products, Inc., has been for many years a large manufacturer of components and accessories for the automotive and aircraft industries. In recent years, it has also been active in the fields of Missiles, Electronics, and Nuclear Energy. Thompson has concentrated on products which require a high level of competence in engineering and precision manufacturing.

The Ramo-Wooldridge Corporation was organized five years ago to conduct research, development, and manufacturing operations in the field of electronic and missile systems having a high content of scientific and engineering newness. In addition to the work performed by Space Technology Laboratories, Inc., Ramo-Wooldridge has been engaged in major systems work in such areas as digital computers and control systems, communications and navigation systems, infrared systems, and electronic countermeasures.

The merger of the two companies into Thompson Ramo Wooldridge Inc. is intended to provide an integrated team having strong capabilities for scientific research, engineering development, and precision manufacturing.

Thompson Ramo Wooldridge Inc.

Main Offices • Cleveland 17, Ohio
Los Angeles 45, California

by William Francis McDonnell

CONTINGENT FEES

Under Government Contracts

A FEW YEARS AGO WE read in the press about the "5 percenters" in Washington. The inference was that improper solicitations of public officers were being made for government contracts. The Congress was then investigating these practices and regardless of whether they were true or false it made good reading in the daily press. There was a national election impending and always at that time the sparks fly fast and furious.

Most lawyers have a general idea of what is unethical practice in the legal profession. But what is unethical representation by laymen before the government departments is sometimes difficult to determine. If learned judges can differ on this point, then laymen representing business corporations should not be expected to always find the fine line of demarcation.

We now have our chart and compass. It is the case of *LeJohn Manufacturing Company* v. *Dwight Webb, Jr.*, decided by the United States Court of Appeals for the District of Columbia circuit on April 28, 1955, and reported in 95 U.S. App. D.C. 358, 222 Fed. (2d) 48.

In the *Webb case*, suit was brought in the U. S. District Court for the District of Columbia for a 5% fee under an agreement in which Webb obtained a government contract. The District Court held that the contingent fee arrangement between Webb and his employer, LeJohn, was all right because it did not involve any political or special influence or any sinister practice contrary to the public interest. But, the appellate court took another view and reversed the District Court. The appellate court said that evidence of improper conduct is not necessary and that the law looks to the general tendency of such arrangements and closes the door to temptation by refusing them recognition in any of the courts of the country.

The appellate court said there is a big difference between being "employed generally to drum up business for the contractor" and being employed solely to "drum up" government business. In the former, it is permissible under Executive Order 9001 (hereinafter more fully explained), and in the latter case it is not permissible under the Executive Order.

The Court of Appeals said that for Webb to take advantage of the exception mentioned above, he must show that his business was *bona fide*, that it was established, that it was a commercial or selling agency and that it was maintained by the contractor for the purpose of securing business. It stated that "we doubt that plaintiff (Webb) has shown any of these things; certainly he has not shown that his business was 'maintained' by the contractor. We conclude that the contingent fee contract in this case violates the public policy declared by the Executive Order, and cannot be enforced."

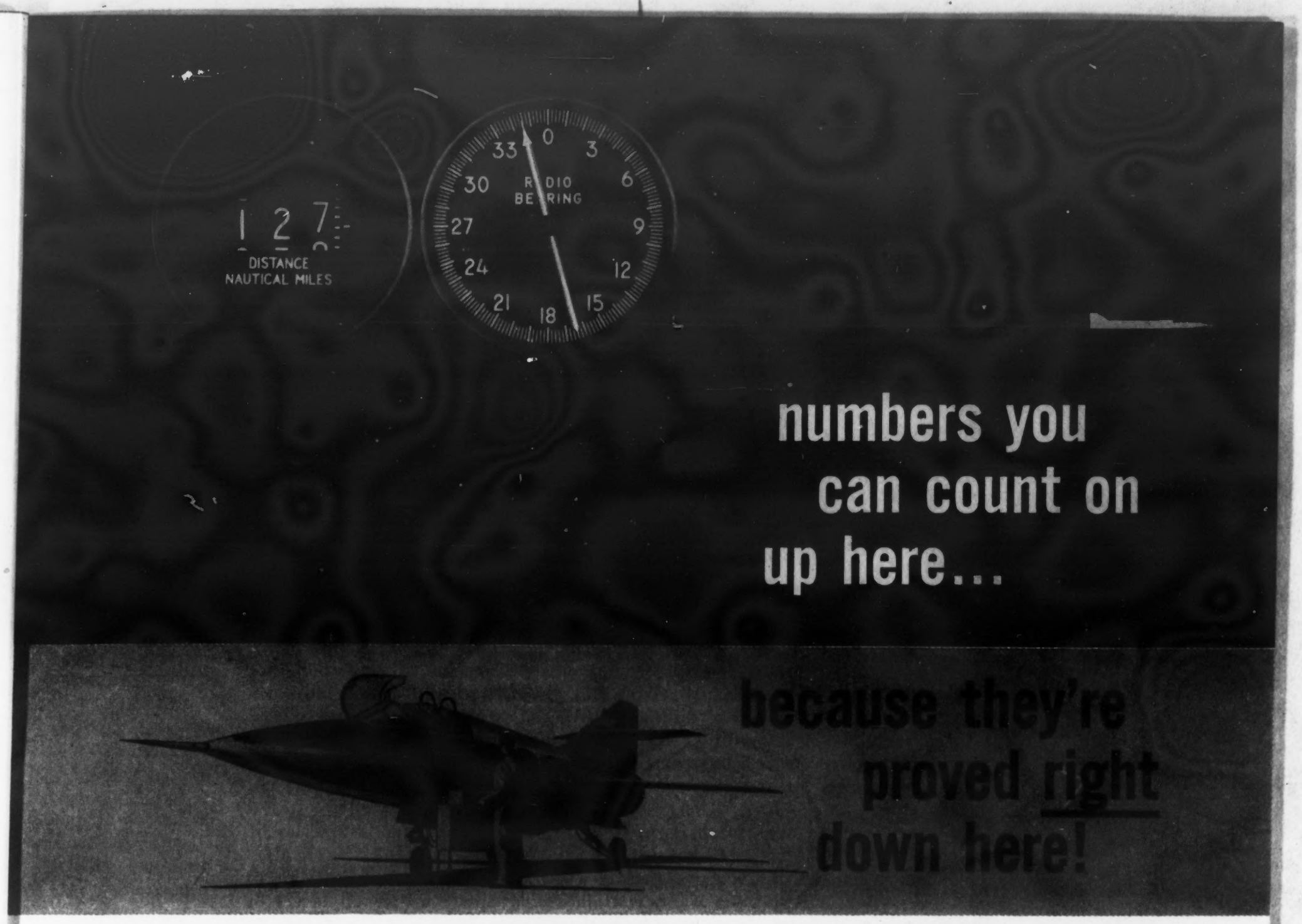
It will be seen that the Court of Appeals has drawn a very fine line when we read the facts in the Webb case. The facts are that Webb got out of the Navy in 1946. In that year, with others, he formed a company called Manufacturers' Agents Incorporated. This company was followed by another called the Huntington Corporation. He carried on the business of a manufacturers' sales agent thru the medium of this corporation, of which he was executive vice president. And on the termination of that corporation's activities in the District of Columbia in May or June 1949, he continued to engage in the business of a manufacturers' sales agent as an individual with offices in the District of Columbia. Prior to the aforesaid termination of the Huntington Corporation's activities in the District, it entered into a contract with the LeJohn Company. This agreement was made in 1949. During the year which followed the agreement, Webb was also a salaried employee of another firm in Pennsylvania, spending but little time in the District. His dispute with LeJohn arose in 1950.

It seems that under the contract Webb was to receive a commission of 5% on all consumed sales of the LeJohn Company's products to the U. S. Government. The arrangement between Webb and the company was an oral one, afterward confirmed in writing. The product chiefly involved was electric fans and the main sales were to the Armed Services. Webb was to receive a commission to any specified or regular duties in connection with procurement and was not obligated to devote any particular amount of time to the LeJohn business. His agency extended only to sales to the government. LeJohn's non-government sales in the District were handled by another agency.

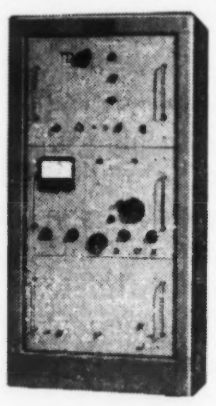
Webb consummated some contracts with the Navy Department and the Corps of Engineers. The president of LeJohn testified that there was a Congressional investigation being made about so-called 5 percenters, and the contracting officer of the Corps of Engineers indicated to LeJohn that because of the investigation by the Congress, they had been notified by the Defense Department that they were only permitted to allow 3% for sales commissions. And in order to go beyond the 3%, an authorization would have to be obtained from the Secretary of the Army or the Secretary of the Navy. whichever department was involved. He further testified that he had talked to Webb, and that Webb said that he

(*Continued on page* 35)

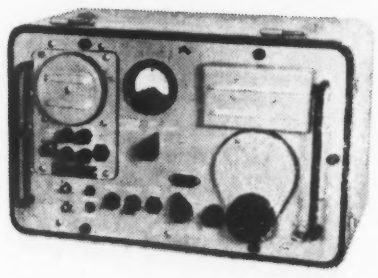
The author is a Washington attorney and a member of the District of Columbia Bar.



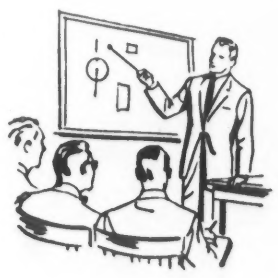
Hoffman test equipment checks TACAN accuracy—on the bench or in the cockpit*



HLI-103 BEACON SIMULATOR duplicates all functions of the AN/URN-3 surface beacon. Tests ARN-21 for full azimuth and entire range, closure and departure speeds, surface beacon identity tone and decoding functions. For bench test or cockpit check. Available on 60-day delivery.



HLI-119 TACAN TEST INSTRUMENT. Portable unit tests *accuracy* of ARN-21 airborne TACAN in the cockpit of aircraft on the ramp or carrier deck. Checks accuracy of range and bearing at pre-set points and identification signals. Availability on request.



TRAINING SCHOOL Classes on use of Hoffman TACAN test equipment are now in progress at the Hoffman plant, and qualified field personnel are available to conduct class instruction at operating sites or bases.

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NEWS FLASH

comprehensive report on research in components

by

U. S. Army Signal Corps

In past issues of this magazine, we have presented many articles covering new electronic systems, concepts and equipments plus many covering the basic philosophy underlying our military-industry relationship. During the year 1958, SIGNAL Magazine was proud to present an official series of articles which we featured under the title of "Stockpile Concept." These articles contained a reservoir of editorial material which could be stockpiled for reference purposes at a later date. So great was the response of acceptance to the "Stockpile" project that we decided to come up with a new package deal in 1959.

In our March issue, we will present an outstanding series of articles entitled "The Signal Corps Reports On Army Research In Components." This comprehensive, all-inclusive package will feature five major articles to be released in a single issue. These articles will include nearly all facets of the Army's component development program going from tiny transistors to multi-megawatt tubes—from simple resistors to complex MASER frequency standards. It is our profound conviction that this presentation will provide our readers with a unique opportunity to gain an over-all picture of the work, technological progress and planning required in this important "component field." It is a terrific editorial presentation never done before and long overdue.

The general subjects covered will be power sources, micro-miniaturization, passive parts development, tubes and transistors, and basic research. The work being done *today* in each of these areas will be explained and projections toward the *future* will be made. Focusing our attention on the more sophisticated activities in the rapidly expanding electronics industry, we all too often forget the vast amount of work that goes into this area of research and development. We know this series of timely articles will act as a reminder of the paramount importance of the component phase of modern electronics. Further details of this one-package project will appear in the January issue of SIGNAL.

THE EDITOR

15,000 Words 20 Illustrations

MARK THIS EVENT

(further details will appear in the January issue)

Major Changes in Nation's Military Planning

Defense Secretary McElroy recently related major changes for overhauling the nation's military planning that will mean more long-range and less intermediate-range missiles, an expanded Navy to meet limited war threats, and a reduction in over-all military strength by some 71,000.

With development of intercontinental-range missiles advancing rapidly, more emphasis will be put on them and less on intermediate-range types, the Secretary indicated. A decision is to be made between *Jupiter* and *Thor* as the nation's chief 1,500-mile-range weapon. Commitments for 1,500-mile missiles in overseas bases will be carried out. Long-range missiles likely to be stepped up in the fiscal 1960 program are the 5,000-mile range *Atlas*, now in the testing stage, and the *Minuteman*, a solid-fueled weapon.

The Defense Chief's comments indicated the Navy is likely to get a go-ahead on modernizing the fleet and possibly building more ships. Mr. McElroy's emphasis on the supply functions of the Navy also suggests that the vessels that carry troops and equipment would get greater consideration in the next fiscal year.

The Secretary also declared the nation's economic and military aid programs are making allied lands less dependent on the U. S. for ground forces. He said future limited wars probably wouldn't require American ground forces, except when it became apparent that an ally couldn't handle the situation with its own ground forces, supported by U. S. ships and planes.

These new trends will show up first in the budget the Administration will send Congress in January for the next fiscal year. Mr. McElroy said he didn't believe the President wanted the Pentagon to do other than "strive our best" for economy in drawing up requests for money.

New York's Industrial Film & A-V Exhibition

The Industrial Film & Audio-Visual Exhibition, held in New York City at the Trade Show Building during the first week of October, broke all records for attendance, number of exhibitors and cooperating associations, according to Herbert Rosen, President of Industrial Exhibitions, Inc., the show's organizer.

The main attractions of this year's exhibition were the governmental and institutional exhibits. The Pictorial Service Division of the U. S. Army displayed its different A-V activities, especially in connection with the missile program and statistical information in regard to film utilization, and the U. S. Navy Training Device Center carried out its theme "Tools For More Effective Training" by showing its different A-V techniques, materials and equipment used in their Research and Development Program. They introduced new sound and projection equipment, projectable training aids, both static and animated, and exhibits on techniques of audio-visual aids development.

The Metropolitan Educational Television Association set up a model classroom with a large television screen that picked up actual television lessons presented by the New York State Regents ETV Unit over station WPIX-TV.

A workshop session presented by the A-V Aids Section of the Civil Defense Research Associates and the Industrial Security Institute attracted an unusually large attendance. Their theme was "A-V Techniques For Civil and Industrial Defense."

Plans for next year's show are already under way, scheduled for September 29th through October 2nd, 1959.

Central Radio Controlled Traffic System

A contract for the establishment of a centrally controlled radio traffic system in Washington has been executed between the Commissioners of the District of Columbia and Motorola Communications and Electronics, Inc., for $167,000.

Said to be the world's largest, the radio traffic control system operates from a central programmer. Information from the programmer is translated by a coder into tones which are then transmitted by radio to FM receivers at each intersection. Here a decoder re-translates the tones to initiate the program or function desired. A central expandable control panel shows the latest program or function.

Constant synchronization is insured by continuous transmission of a synchronizing signal to all intersection controllers in the system which is independent of and does not interfere with function changes.

In order to eliminate every possible type of interference, the radio equipment will operate in the most dependable part of the radio spectrum as allocated by the FCC for this type of service. The frequencies are in the 952-960 Mc band, the most optimum choice in the public safety operational fixed service.

Personnel Available

As a service to AFCEA members, SIGNAL will make space available in this column for those members who are interested in employment in the communications, electronics and photography industries. Any member is entitled to three insertions in the magazine on a space available basis, free of charge. Please limit your notice to 5 lines. In replying, employees are asked to address: Box ....., SIGNAL 1624 Eye St., N. W., Washington 6, D. C. Letters will be forwarded to the AFCEA member.

LCDR USN (Ret) (Ex-WO)—28 years' experience electronics-communications-installation/maintenance—some design/sales experience—desires association with U. S. firm—Resident England but will return U. S. for short indoctrination period if necessary. Box 143.

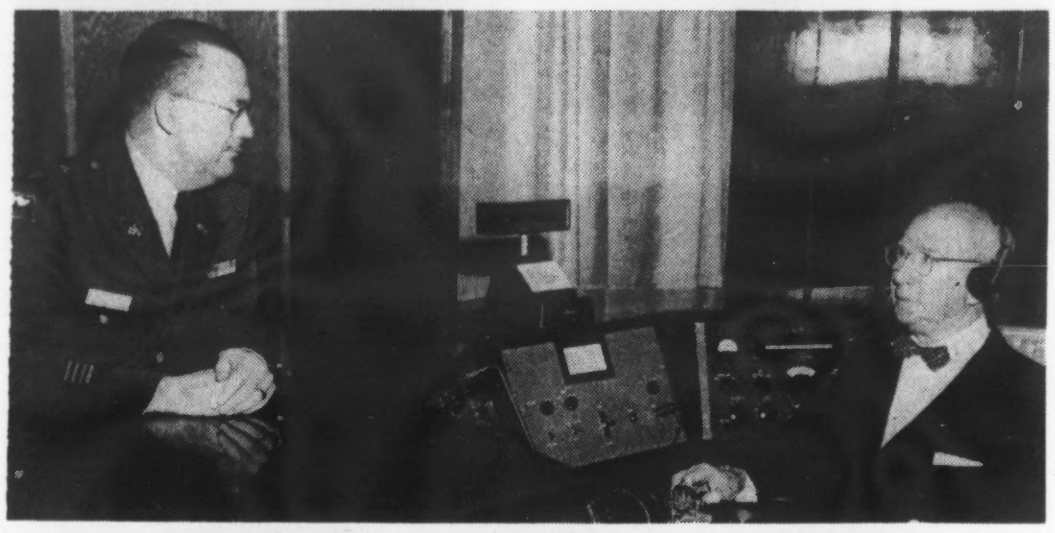
COMMUNICATIONS AND ADMINISTRATIVE RADM USN (Ret.) 31 years' service desires affiliation in communication, administrative or management position. Extensive experience in planning, operation and administration of communication facilities. Master of Engineering Administration, George Washington University. Box 144.

Government and Military Positions Available

Government and military agencies are invited to use this column to announce available positions which may be of interest to the readers of SIGNAL. Notices will be published three times if not cancelled before. Applicants apply as indicated in individual notices.

TRAINING OFFICERS IN THE MILITARY SCIENCES are needed at the U. S. Naval Training Device Center, Port Washington, New York. Entrance salaries are $7,030 and $8,330 a year. Persons appointed to these positions will participate in programs for the development, production and utilization of military training devices and in the training of technical personnel to maintain and operate these devices. Applicants must have completed college study in both technical and educational fields, have had appropriate military or civilian training experience, or have had any time-equivalent combination of education and experience. In addition, they must have had specialized experience in training programs concerned with technical equipment. Application forms may be obtained from U. S. Civil Service Commission, Washington 25, D. C., and should be sent to the Board of U. S. Civil Service Examiners, U. S. Naval Training Device Center, Port Washington, New York, until further notice.

AMATEUR RADIO



The author (left), special assistant to the commandant, U. S. Army Signal School, and Major General Joseph O. Mauborgne (Ret.), Chief Signal Officer 1937-1941, at the new MARS Amateur Radio Station at Fort Monmouth. General Mauborgne is one of the oldest hams in the Army Signal Corps and an Honorary Life Member of AFCEA.

IN THE SERVICES

by Col. Fred J. Elser, SigC

NO ONE CAN BE CERTAIN who the first service radio "ham" was: but probably one of the first was Maj. Gen. Joseph O. Mauborgne, USA Ret. When he was ordered to the Signal School at Fort Leavenworth, Kansas, in 1909, General Mauborgne took with him his spark set so that he could "pound brass" thru the rigors of a winter on the Kansas plains. This early interest must have had something to do with the fact that in the Philippines, General Mauborgne was instrumental in the installation of a powerful Telefunken quenched spark transmitter at Fort Mills, Corregidor Island in Manila Bay. He also collaborated with the late General "Hap" Arnold in pioneering the first wireless communication between aeroplanes and the ground.

The modern counterpart of this early pioneer of "Wireless" in the military services is well evidenced by the activity of such "hams" as General Curtis LeMay, Vice Chief of Staff of the Air Forces (whose recent exploits in Africa with another "ham": Arthur Godfrey (K4LIB) received considerable notice); Rear Admiral Henry C. Bruton, former Director of Naval Communications, George Bailey, Executive Secretary of IRE and Director of AFCEA, who communicates around the world nightly, and Brig. Gen. Earle F. Cook, Chief, Research and Development Division, OCSigO, whose article in SIGNAL on "Efficient Spectrum Utilization" was published in November 1957.

Although individual amateurs in the services were active many, many years ago, it was not until World War I and after, that the services began to appreciate the value of organized amateur radio as a source of personnel, equipment and frequencies in time of need. In fact, it is reported that the commanding officer of the Naval Communication Center in Washington at the close of World War I was of an entirely opposite opinion. He was not convinced until his aide, an amateur operator, mustered for his inspection the "hams" in the comm-center; a matter of over 90% of the men there at the time!

After the bridging of the Atlantic and Pacific oceans on short waves by "ham" operators in the early 20's had added long distance to prior organization for continental message-relaying and the handling of local disaster traffic to the accomplishments of "ham" brass-pounders, the services took concrete steps to affiliate amateur operators more closely into the twin services. About a third of a century ago, both the Navy, with its Naval Communications Reserve (N.C.R.), and the Army with its A.A.R.S. (Army-Amateur Radio System), initiated organizations, which, with minor charges, still function today.

In the summer of 1925, when the Pacific Fleet made a cruise to New Zealand and Australian waters, to complement the high-power long wave radio apparatus aboard, the Navy brought to active duty Lt. Fred Schnell, an amateur of Hartford, Connecticut, who had been the first U. S. amateur operator to communicate across the Atlantic on short waves in 1923. Schnell's low powered short wave transmitter aboard the *Seattle* soon made the call NRRL famous on the amateur frequency bands, and his musical 500 cycle note became familiar to amateurs all over the world.

A newly established short wave station at Fort Wm. McKinley in the Philippines erected by Lt. (now Col. Ret.) H. P. Roberts of the Signal Corps, was one of the first transpacific contacts made by Schnell as he started across the ocean, and was the last to be contacted by the *Seattle* before the "hook" was dropped at San Diego after the cruise was over.

At Fort Monmouth, meanwhile, Capt. (now Brig-Gen. Ret.) Tom Rives was one of the "spark-plugs" in the newly-organized A.A.R.S. Soon the organization was in full force: 2CXL communicating periodically with stations at the Hq's of the nine Corps Areas, which in turn relayed messages, information and tests back and forth through the state Hq stations and so on down to the individual members.

The systems grew and flourished: soon they were to be put to the real test.

The few thousand amateurs employing their talents in the services during World War I expanded to many thousands in World War II. The onset of that emergency found not only amateur men and women in uniform but many in civilian attire as instructors or maintenance/production personnel. The release of millions of dollars of scarce equipment such as radio receivers, and indicating meters eased shortages in the early stages of the war, and the conversion of vacated amateur frequency bands gave sorely needed kilocycles not occupied by other stations.

At the end of World War II the Navy revived the N.C.R. The Army and the Air Force jointly established the MARS (Military *Amateur* Radio System, later changed to Military *Affiliate* Radio System). Membership in these organizations was made widespread. At present any U. S. citizen 16 years of age or over who is a radio amateur can join MARS. Certain distinct advantages accrue to the individual. For example, in MARS, active members become eligible to receive surplus equipment made available from time to time. They may also receive correspondence course material on a variety of subjects from television repair to Single Sideband theory. Naval Reservists have similar advantages, including the opportunity of taking training cruises on Naval ships.

In addition to the organized activities, many individual service amateurs still carry on the old traditions of individual advancement: both for themselves and for their services in modern electronics fields as new as transistors, or operation "Vanguard."

Nor are all the service amateurs uniformed. Civilian engineers are avid

"hams" too. In 1909 when the late George Eltz* became the first Vice President of the newly formed New York Radio Club (later to become the Radio Club of America and Institute of Radio Engineers) he little thought that in 1958 he would be a division director in the U. S. Army Signal Corps Engineering Laboratories, but still active "on the air" with single sideband from his home in Belmar, N. J.

Perhaps Leo C. Young (W3WV) of Washington, D. C., had a better idea of his future part in the Naval service, since he has had an important part in the engineering of Naval radio facilities since years before the Fleet changed over to short wave.

*Mr. Eltz, one of the leaders in communications; passed away several months ago. He will be long remembered by his friends in AFCEA.

When a radio car was proposed for President Roosevelt's train to keep him in touch with Washington during his continental trips, the job was given to Col. Bill Beasley (W9FRC). His ingenious solution of the antenna problem, in particular, enabled the Signal Corps radio teletype operators to "get the message through" from all parts of North America during and after World War II. Although now retired from the Army, Bill still keeps up with activities of the radio car and service amateurs like George Hart, whose single sideband transmissions from the train were widely received, even from inside tunnels.

Another mobile "sidebander" is General Griswold of the Air Force. He became active right after World War II from Guam and lately has flown all over the world with various single sideband equipments aboard his plane.

Some service amateurs are extremely active. One Signal Corps officer, Lt. Col. Lloyd Colvin was recently featured on the cover of a radio magazine for his feat in first communicating with several hundred radio amateurs having different "prefixes" all over the world. Then there is Cdr. Ray Meyers, USNR, who is organizing the AFCEA Net. Ray has pounded the key for more years than he wants to remember.

The spirit of the radio pioneer is not dead. The scope of amateur radio has widened, and the number of the practitioners of the art has greatly multiplied. Complexities have grown, but so have the tools for coping with them.

The essential spirit of inquiry, worthwhile accomplishment and "camaraderie" of the frequency bands is as alive in '58 as it was in '02 when that first amateur, Marconi, heard the first signal across the Atlantic.

Contingent Fees

(*Continued from page* 30)

would go along on this 3% basis, but that Webb told him that if there was any possible chance of hiding the additional 2% through engineering or administrative costs he would appreciate it, and that he would like to get as much as 5%. Subsequent thereto it appears that Webb's services were dispensed with by LeJohn.

Thereupon, Webb filed suit in the District of Columbia for the full 5%. He had been tendered payment of 3%, which he refused to accept. The trial judge in the U. S. District Court for the District of Columbia gave judgment to Webb for the full commission of 5%, amounting to $4,258.05. The District Judge upheld the contingent fee arrangement, relying in part on a finding of fact that "the efforts of the plaintiff (Webb) on behalf of the defendant (LeJohn) did not involve the use of any political or special influence, or any corrupt or sinister practices contrary to the public interest." (The fact that the Defense Department invoked the 3% commission rule, of course, had no legal effect.)

The District Judge took the position that "it certainly does not stand in the defendant's (LeJohn) mouth to allege or claim illegality of a contract which it entered into openly and of which it has received the benefit." But, as to this, when the case went to the Court of Appeals of the District, and the District Judge was reversed, the appellate court said that the policy of the law is not concerned with the moral or ethical standards of clients served; that the purpose of the law is to prevent improper pressures, and the fact that a client may be one of such low moral and ethical standards as to take advantage of his agent, certainly constitutes no reason for permitting his agent to take advantage of the Government.

The Court of Appeals went on to say that "in any event it is clear that actual evidence of improper conduct is not necessary to render such agreements unenforceable" and that the law looks to the general tendency of such agreements, and it closes the door to the temptation by refusing them recognition in any of the courts of the country.

In the Court of Appeals the LeJohn Company argued that Webb did not conduct an established selling agency; that at the time of the alleged agreement with LeJohn he was working for the Huntington Corporation; that during the period of the alleged employment he was working as a salaried employee in a distant city for another firm; that Executive Order 9001 should be construed to prohibit contingent commission to Webb because he sold only to the United States and not to commercial concerns. LeJohn also argued that Webb wrote to LeJohn implying that he had special influence over government officials in matters involving either low or high bids and that Webb was not an officer, stockholder or employee of LeJohn—nor was he an engineer. LeJohn said that Webb testified that he wanted to conceal from the government part of his commission; that he had previously requested LeJohn to conceal part of the commission on a sale to the Corps of Engineers, and that LeJohn could not pay Webb more than 3% for the sale to the Corps of Engineers because no more was allowed by that department.

The Court of Appeals discussed the question of contingent fee contracts. It quoted the Supreme Court to the effect that contingent fee contracts to secure government business are invalid because of their tendency to induce improper solicitation of public officers and the exercise of political pressure. The Court then cited Executive Order 9001, issued pursuant to the First War Powers Act and the Armed Services Procurement Act. The court stated that at the time Webb made the arrangement with LeJohn the Executive Order required government procurement contracts to contain a warranty clause to the effect that the contractor warrants that he has not employed any person to solicit or secure the contract upon any agreement for a commission, percentage, brokerage, or contingent fee. And that upon breach of the warranty the government could either annul the contract, or in its discretion deduct from the contract price the amount of such commission or brokerage fee.

Executive Order 9001 concludes with this interesting sentence, which is the heart of the case:

"This warranty shall not apply to commissions payable by contractors upon contracts or sales secured or made through *bona fide* established commercial or selling agencies *maintained* by the contractor for the purpose of securing business."

The key word is "maintained." Webb contended that he was a *bona fide* established commercial or selling agency maintained by the contractor to secure business and thus entitled to the benefit of the exception.

The Court of Appeals also denied recovery on a *quantum meruit* basis (as much as he has earned), that is, for the reasonable value of his services, outside of the contract. The theory is that no one shall be allowed to enrich himself unjustly at the expense of another. But, the appellate court said that since the contract itself is void, this prohibits recovery of any compensation at all under it.

Boiled down then, the law at this moment seems to be that contingent fees under government contracts are illegal unless (a) the business is a *bona fide* one, meaning one carried on in good faith without fraud or unfair dealing; (b) that it is an established business; (c) that it is a commercial or selling agency; (d) that it is maintained by the contractor for the purpose of securing busineses generally and it is not used solely to "drum up" government business.

FROM THE DESK OF THE EXECUTIVE VICE PRESIDENT:

THE swift seasons have rolled to December, when faces and feelings soften—or should—in anticipation of Christmas and of the beginning of a new and promising year. With these thoughts in mind, I extend to all AFCEANS my best wishes for a supremely happy holiday season and an outstandingly successful New Year. May all our members be blessed with the good things of life during 1959!

We look forward optimistically to a year of accelerated advance and prosperity. As stated by President Furth in our November SIGNAL, the health and success of any organization depend on steady growth. (Since the forming of man's first organization, philosophers and realists both have opined accurately that to stand still is to retrograde.) Our membership drives are under way in force; in fact, these have never ceased. We are hoping to provide new and comprehensive services to members, which will eventuate when the Association has grown considerably; and in stride we are already working on our 1959 Convention and Exhibit, scheduled to be held at the Sheraton-Park Hotel in Washington on June 3, 4, and 5. 1959 will be a year to remember in AFCEA's history.

Some items we hold to be of major importance in 1959 are these:

- *Vast increase in group and individual memberships.*

  Our goal is a threefold increase in group memberships and a fourfold increase in individual. Although the figures are a trifle high for one calendar year, nevertheless we want to have these desiderata well on the way to being met during 1959. Membership drives are not a one-man function; they are an "all hands" effort; therefore, I solicit the help of every member and subscriber of AFCEA. In messages to Chapters, I suggest methods of obtaining new members and of holding old ones; mostly, these methods are just "common sense." A powerful underlying thought here is that a radical increase of members will result in more effective services to all members, as well as in a greater AFCEA.

- *A highly successful 1959 Convention.*

  All members can help by attending; they can assist further by causing others to attend and industrial firms to exhibit. The Convention Committee, of which I am Chairman again, will bend its efforts toward quality—in the exhibits, the professional papers or panels, and the social events. We aim to make this Convention the best yet. Earmark the dates and the place.

- *Noteworthy increase in advertising.*

  SIGNAL, AFCEA's superior monthly, can aim even higher if it has more advertising. Our group members, prospective group members and others reap great benefits from SIGNAL advertising. Will Copp, our Advertising Representative, is now promoting the "package deal," wherein the using firm will become a group member, will advertise in SIGNAL regularly, and will exhibit at our Convention—all very profitably. As AFCEA grows, the "package deal" will naturally be more and more advantageous to the user.

- *Increase in some other benefits.*

  Now impracticable because of low funds, a system of Association-wide scholarships will be a most interesting and stimulating result of notable increases in AFCEA's memberships. A good deal can also be done in finding positions for retired personnel who have gained wide experience in communications, electronics, and photography; in fact, I already have information on six or more superlatively well-qualified and seasoned retirees of the Armed Services, and will welcome queries. We may also be able to have more traveling representatives from Headquarters, capable of keeping their fingers more firmly on the member pulse. Possibly we can establish a regular, comprehensive information service. But all these depend on Association growth.

For those who like to have eye-pleasing evidence of their membership, attention is invited to the information on available AFCEA Insignia (lapel buttons, medals, decalcomania, and certificates), such as appears on the last page of this issue (page 52).

My plans call for trips to as many chapters as I can manage to schedule during Calendar 1959, with a particular view of traveling to the five in the USA that I have not yet visited, in addition to others of the thirty-three already visited in 1957 and 1958.

While it is trite to keep asking for comments and recommendations on every phase of our AFCEAN effort, nevertheless I do honestly and sincerely mean that I would like to have them. As we have stressed, AFCEA must grow bigger and better all the time in order to exist, and one of the finest things that a member can do is to show his interest by forwarding carefully thought-out comments and recommendations. As we all know, nothing gets done really well unless there is *INTEREST*.

My strongest message is indeed "Help the Association grow!" but I urge again that we never forget or neglect the important missions of AFCEA: To maintain and improve the cooperation between the Armed Forces and industry in the design, maintenance and operation of communication, electronic, and photographic equipment in time of peace as well as in time of war; to foster appropriate measures toward the development of adequate reservoirs of scientists and engineers in our great country; and to preserve and foster the spirit of fellowship among former, present, and future service and industrial personnel in these fields.

Happy holiday greetings!

Respectfully and cordially yours,
W. B. (BILL) GOULETT
Captain, USN (Ret.)
Executive Vice President

AFCEA Group Members

Communications—Electronics—Photography

Listed below are the firms who are group members of the Armed Forces Communications and Electronics Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCEA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation.

Acme-Danneman Co., Inc.
Admiral Corp.
Aircraft Radio Corp.
Allied Control Co., Inc.
Allied Radio Corp.
American Cable & Radio Corp.
American Institute of Electrical Engineers
American Machine & Foundry Co.
American Radio Relay League
American Telephone & Telegraph Co.
American Telephone & Telegraph Co., Long Lines Dept.
Ampex Corp.
Amphenol Electronics Corp.
Anaconda Wire & Cable Co.
A. R. F. Products, Inc.
Arnold Engineering Co.
Atlas Film Corp.
Atlas Precision Products Co.
Automatic Electric Co.
Automatic Electric Sales Corp.
Automatic Telephone & Electric Co., Ltd.
Autonetics, Division of North American Aviation, Inc.
Barry Controls, Inc.
Bell & Gossett Co.
Bell Telephone Company of Pa.
Bell Telephone Laboratories, Inc.
Bendix Radio Division, Bendix Aviation Corp.
Bliley Electric Co.
Bomac Laboratories, Inc.
British Thomson-Houston Co., Ltd.
Bruno-New York Industries Corp.
Burroughs Corp.
California Water & Telephone Co.
Cambridge Thermionic Corp.
Capitol Radio Engineering Institute, Inc.
Carolina Telephone & Telegraph Co.
Central Technical Institute
Chesapeake & Potomac Tel. Co.
Cincinnati & Suburban Bell Tel. Co.
Close Associates, Inc.
Collins Radio Co.
Columbia Broadcasting System, Inc.
Contraves Italiana
Convair, Division of General Dynamics Corp.
Cook Electric Co.
Copperweld Steel Co.
Cornell-Dubilier Electric Corp.
A. C. Cossor Ltd.
Craig Systems, Inc.
Crosley Division-Avco Mfg. Corp.
Designers for Industry, Inc.
DeVry Technical Institute
Diamond State Telephone Co.
Dictaphone Corp.
DuKane Corp.
Du Mont, Allen B., Laboratories, Inc.
Eastman Kodak Co.
Electronic Associates, Inc.
Electronic Communications, Inc.
Elgin Metalformers Corp.
Fairchild Camera & Instrument Corp.
Federal Telecommunication Laboratories
General Aniline & Film Corp.
General Communications Co.
General Electric Co.
General Telephone Corp.
Gilfillan Bros., Co.
Globe Wireless, Ltd.
Gray Manufacturing Co.
Hallamore Electronics Co.
Haller, Raymond and Brown, Inc.
Hallicrafters Co., The
Haloid Xerox Inc.
Hazeltine Electronics Division, Hazeltine Corp.
Heinemann Electric Co.
Hoffman Laboratories, Inc.
Hogan Laboratories. Inc.
William F. Hogan Associates, Inc.
Hughes Aircraft Co.
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
Institute of Radio Engineers
International Business Machines
International Resistance Co.
International Telephone & Telegraph Corp.
International Telephone & Telegraph Laboratories
ITT Federal Division of International Telephone & Telegraph Corp.
Jacobsen Manufacturing Co.
Jansky & Bailey, Inc.
Jerrold Electronics Corp.
Kellogg Switchboard & Supply Co.
Kleinschmidt Laboratories, Inc.
Leich Sales Corp.
Lenkurt Electric Co.
Lewyt Manufacturing Corp.
Lockheed Aircraft Service, Inc.
Machlett Laboratories, Inc.
Magnavox Co.
Marconi's Wireless Telegraph Co. Ltd.
Materiel Telephonique Co.
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Montgomery Co., The
Motorola, Inc.
Mountain States Telephone & Telegraph Co.
Mullard Ltd.
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O'Keefe & Merritt Co.
Otis Elevator Co., Electronic Division
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Weston Electrical Instrument Corp.
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Wilcox Electric Co., Inc.
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Wisconsin Telephone Co.
Wollensak Optical Co.
Zenith Radio Corp.

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Association affairs

Chapters Recruit New Members

National Headquarters is pleased to note that several chapters have recruited a sizable number of new members.

Listed below are those chapters that have gained over fifteen new members during the three-month period ending October 31.

Fort Monmouth—125
Decatur—98
Washington—34
Chicago—29
Tinker-Oklahoma City—28
New York—22
Atlanta—20
Hawaii—20
Northeastern University—20
South Carolina—19
Southern California—19
Montgomery—18
Scott-St. Louis—17

Ham Directory

Ham operators will be interested to know that there is still time to be listed in the ham operators directory being prepared by Ray Meyers, Regional Vice President for the West Coast Area. Name, rank, call letters and other pertinent information should be sent to Ray Meyers at 717 Anderson Way, San Gabriel, California or to the Editor, SIGNAL Magazine.

More Ham Call Letters

The number of AFCEA's ham operators has increased rapidly since SIGNAL last carried a listing (SIGNAL, May 1958). The new operators' call letters are listed by States.

Arizona: W7AK, W7AYV
California: W6KG, W6GYH, W6YY, W6BMC, K6HV, W6RLZ, W6AOI, W6QMM, W6ONP, W6BLZ, W6BGH, W6ORS, W6TMY, W6STD, W6UJI, W6IHK, W6MLZ, W6HJT, W6OON
Colorado: KØHVJ, KØHVM, KØJAI, WØTGL
Connecticut: WIUED, WIVSS, WIJZD
District of Columbia: W2VU/4, W4KN, K6AB/4, W3CV
Florida: W4UHY
Illinois: W9DW, W9JOU, W9AC, W9CTZ, W9EGX, W9AQS, W9GRW, W9HXE, W9GXE
Iowa: WØCXX
Kansas: WØWYK, WØDEL
Maryland: W3II, W3DUY
Massachusetts: WIFL, WITUP
Mississippi: W9JOU/5
Missouri: KØBLH (operating DL-4OZ at present)
Nebraska: KØDWC
New Jersey: W2GVU, W2HBV, W2VU, K2CR
New York: W2APF, W2PF, W2HF, W2KH, W2AV, W2IN, W2CVL
New Mexico: W5WWR
North Carolina: W4DIH
Pennsylvania: W3UGR
Rhode Island: WIBCR
Virginia: K4AQV, W4DIH, K4MGM, W2VU/4, K4LIB, W4TFA, W4LIB, W4ZM
Germany: DL4OZ

Honor Graduate Awards

Seven officers graduating with top honors from courses at the United States Army Signal School at Fort Monmouth, New Jersey were recently presented the AFCEA Award for outstanding scholastic achievement.

Section 239-Capt. Vincent R. Eberhart, 1409 S. H. St., Lake Worth, Fla., Associate Signal Officer Advanced Course.

Section 240-Capt. Allan F. Jose, 721 Pinebrook Rd., Eatontown, N. J., Associate Signal Officer Advanced course. Business Administration, University of Maine.

Section 701-Second Lieutenant Thomas S. Smith, 89 Burdsall Ave., South Fort Mitchell, Ky., Signal Officer Basic course. Electrical Engineering, University of Notre Dame.

Section 702-Second Lieutenant Richard J. Emery, 113 Main St., Athol, Mass., Signal Officer Basic course. Chemical Engineering, Worchester Polytechnic Institute.

Section 2407-Second Lieutenant Thomas D. MacArthur, 117 Crescent, Burlingame, Calif., Microwave Radio Officer course. Electrical Engineering, Stanford University.

Section 3209-Second Lieutenant William D. Coryell, 1316 Forest Ave., Maysville, Ky., Field and Fixed Station Radio Officer course. Electrical Engineering, Purdue University.

Section 4022-Second Lieutenant Robert M. Trick, 6510 E. 60th, Seattle 15, Wash., Radar and Countermeasures Equipment Repair Officer course. Electrical Engineering, University of Washington.

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TINKER-OKLAHOMA CITY: Pres.—Col. William L. Gregory, Hqs Continental AACS Area, Tinker AFB, Okla. Sec.—Capt. James D. Porter, 3rd AACS Sqdn. (Mob), Tinker AFB.

TOKYO: Pres.—Capt. Frank A. Dingfelder, Staff, Cdr. Naval Forces Japan, FPO S. F., Cal. Sec.—Cdr. Harold B. Kirkham, Naval Comm. Facility, Navy 830, Box 20, FPO, S. F.

WASHINGTON: Pres.—John R. O'Brien, Hoffman Labs, Inc., 1625 Eye St., N. W., Washington, D. C. Sec.—A. W. Christopher, Jr., Sylvania Electric Products, Inc., 734-15th St., N.W.

Chapter News

Baltimore—Fort George G. Meade was the scene of the chapter's first meeting of the fall season. Shown at the head table are, left to right: George C. Ruehl, Jr., AFCEA Regional Vice President; Mrs. Vernon E. Day; Lt. Col. W. D. McClellan; Mrs. Riley A. Graham; Chapter President Trevor H. Clark; Col. Riley A. Graham, Signal Officer, Second Army, who was host; Mrs. George C. Ruehl, Jr.; Capt. Vernon E. Day, USCG, and Adam A. Fiedler.

Arizona

Lt. Col. William C. Golladay, Hq., 72nd Sig. Bn., Ft. Huachuca, was named president during the recent annual election of officers.

The other officers elected are: Lt. Col. William M. Coeyman, vice-president and Samuel M. Dyer, secretary-treasurer.

Members of the Board of Directors: Arthur H. Mudgett, Lt. Col. Clarence O. Coburn, Lt. Col. L. F. Walker and Reginald D. Walls.

The chapter's November 4th meeting held, at Fort Huachuca Officers Club, featured William Welch, Director of Research, Military Electronics Division, Motorola, Inc., on the subject of "The Impact of Solid State Electronics on Military Systems."

Augusta-Fort Gordon

Guest speaker at the September meeting was Col. William D. Harden, USMC Reserve. He discussed and displayed a most interesting collection of pistols and rifles dating back to the eleventh century.

The October meeting featured a lecture-demonstration on stereophonics.

The usual social hour preceded each meeting at Timmerman's in Augusta. The numerous guests were introduced to the membership by President James Williams.

Baltimore

The first meeting of the 1958-59 season was held on September 23rd at the Officers Club, Fort George G. Meade. Col. Riley A Graham, Signal Officer, Second Army, was host for the occasion. Cocktails and dinner preceded the meeting, with seventy-five members and guests attending.

After dinner, welcoming remarks were made by Chapter President Trevor H. Clark and Colonel Graham. In addition, Regional Vice President George C. Ruehl, Jr., who is the chapter's membership chairman, stressed the value of membership in the AFCEA, and Adam Fiedler, program chairman, gave a preview of the programs scheduled for future meetings.

The president also announced that the executive committee had elected Colonel Graham a vice president to succeed Col. R. H. McKenzie, who had been transferred.

The program feature was the U.S. Army color film "The Pentomic Army." Introductory remarks were made by Lt. Col. W. D. McClellan of the Second Army Signal Office.

Boston

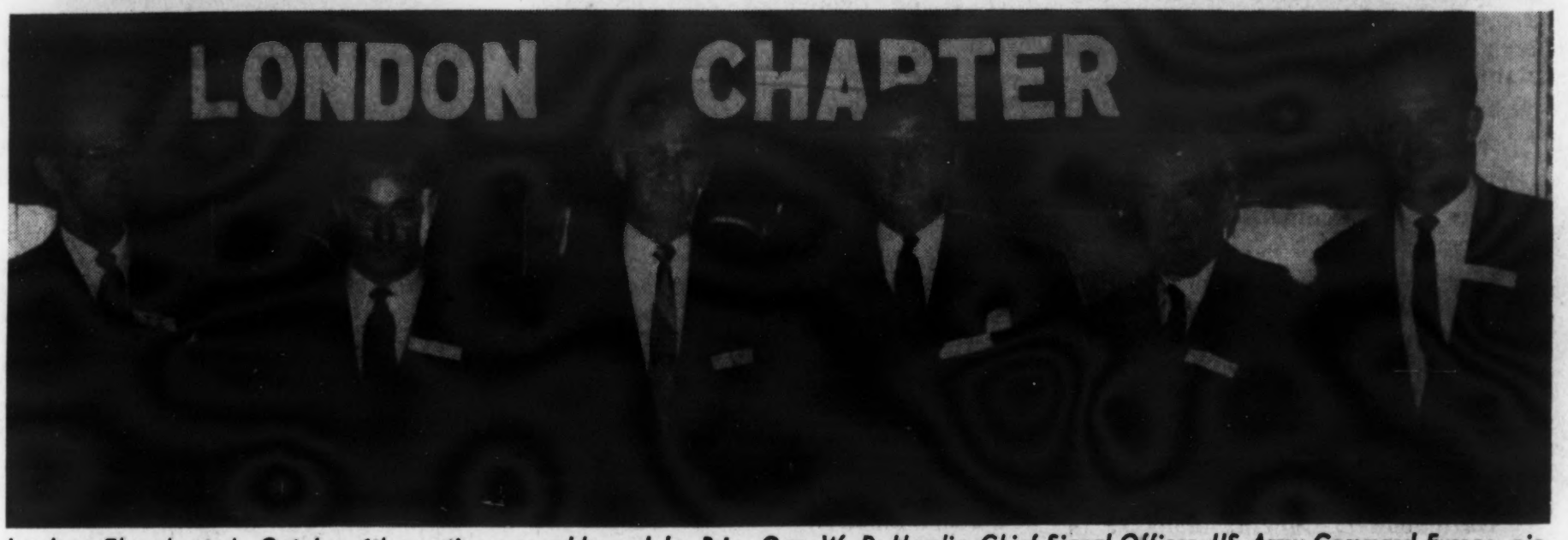
The opening meeting of the fall season was held on September 18th. Following a social hour and dinner at Fort Devens, a tour was made of the Communications Center for the Executive Office of the President, Office of Civil and Defense Mobilization, Region I at Harvard, Mass. This is the communications center for non-military defense communications for the New England, New York and New Jersey area. Willard D. Whitefield, Director of Communications, was host to the chapter. The tour included a talk by Col. A. A. Morrissette, USAR, Deputy Regional Director, Region 1, OCDM, regarding Civil Defense organization; an explanation of the warning network by James McNair of the Office Staff; and a live demonstration of the nation-wide warning system with all parts of the country being contacted in minutes without prior notice.

Chicago

It is traditional that the first meeting of the year be held at The Hallicrafters Company. William J. Halligan, Jr., Vice President — Sales, Hallicrafters Com-

Boston—Willard D. Whitefield, Director of Communications for the Executive Office of the President, Office of Civil and Defense Mobilization, in center, points out home emergency supplies at the September 18th meeting. At left are Col. A. A. Morrissette, USAR, Deputy Dir., Region I, OCDM, and Chapter President Robert B. Richmond. At right are Treasurer Vernon T. Adams and Col. Murray D. Harris, PMST at Northeastern Univ., past president.

LEFT: Col. George P. Sampson, Chief, Army Communications Service Division, USA, who addressed the Chicago Chapter's September 25th meeting held at the Hallicrafters Company. ABOVE: Taken at the September meeting of the Gulf Coast Chapter shows, left to right: W. Kelly Mosley, Regional Vice President; W. B. Goulett, Executive Vice President; Chapter President Ancil Z. Arseneau; Chapter Secretary George A. Teunisson and George Sheffield of Southern Bell T&T Co.



London—The chapter's October 6th meeting was addressed by Brig. Gen. W. D. Hamlin, Chief Signal Officer, US Army Command Europe, pictured with chapter officers above. L. to R.: H. G. A. Kay, associate vice president; Maj. C. L. Bachtel, USA, vice president; Gen. Hamlin; Capt. H. Williams, Jr., USN, president; Sir Reginald Payne-Gallway, Bt., associate vice president, and Capt. H. W. Gipple, USAF, secretary.

Louisiana—Shown at the September meeting which was held at the Naval Air Station, Alvin Callender Field, Belle Chasse, are, left to right: Regional Vice President W. Kelly Mosley; Executive Vice President W. B. Goulett; Rear Adm. Walter G. Schindler, USN, Commandant, Eighth Naval District; and Chapter President William A. Gillentine.

Montgomery—The distaff side gives its active support to all activities of the chapter. Shown at a recent meeting held at Maxwell Air Force Base Officers Club are, left to right: Mrs. Herbert Herman (Lt. Col. Herman is the chapter's president); Mrs. William H. Lyle (Col. Lyle is Chief, C-E Doctrinal Div., Air Command and Staff College, and a member of the chapter's board of directors); Mrs. Calma Weiss (Mr. Weiss is District Engineer for Southern Bell T&T Co., and a chapter director), and Mrs. Sterling Briggs (Col. Briggs is Director, C-E, SAGE, Gunter AFB).

pany, amply lived up to his past reputation for being a gracious host to AFCEA.

After the dinner, and after welcoming remarks by Mr. Halligan, the guest speaker, Col. George P. Sampson, was introduced by Col. Albert J. Mandelbaum, Signal Officer, Fifth Army, and Chapter Director. Colonel Sampson, Chief, Army Communications Service Division, U.S.A., spoke on "UNICOM" (Universal Integrated Communication System).

For a complete report on Colonel Sampson's talk, which was first presented by him and his panel at the AFCEA National Convention in Washington in June, see the August issue of SIGNAL.

Dayton-Wright

Officers, Directors and committee chairmen met on October 1st to start chapter activities rolling for the year. The various phases of chapter operation were coordinated to ensure a successful program.

K. C. McClellan of Avco Manufacturing Corp. was appointed new chairman of the membership committee.

Decatur

The chapter's first meeting of the fall was held on September 30th in the Decatur Signal Depot Officers Mess.

This meeting consisted of a fellowship hour and a business session devoted to formulating plans for program and other chapter activities for the year.

Fort Monmouth

Close to two-hundred persons attended the first dinner-dance of the chapter at Gibbs Hall Officers Club on October 16th.

Music for dancing was provided by the Blue Notes Orchestra, following a steak dinner and short business session conducted by Col. A. L. Burke, chapter president.

On hand for the occasion were Capt. W. B. Goulett, Executive Vice President, and Glenn D. Montgomery, Regional Vice President.

Special guests of the chapter were Pfc. Ollie E. Cavender and Mrs. Cavender. Earlier in the day, at the graduation ceremonies at the U.S. Army Signal School, Mr. Cavender had been presented a special diploma and plaque as the 150,000th enlisted specialist graduate of the school.

Gulf Coast

The program of the October 7th meeting was presented by Capt. George A. Cunningham, USAF. He discussed communications for the Atomic Test in New Mexico and Eniwetok where he had been stationed as a communications officer.

Kansas City

Radio and TV Station KCMO furnished the program for the October 23rd meeting. Special guests were: E. K. Hartenbower, General Manager of KCMO Radio and Television Station, C. E. Breazeal, Assistant Manager, KCMO, and Karl Troeglen, Technical Director, KCMO.

Mr. Hartenbower, speaker of the evening presented an informative talk about the origin, purposes, and special offerings of KCMO Radio and TV Station. The station is an associate of Meredith Publications of Des Moines, Iowa, and collaborates with the *Better Homes and Gardens Magazine* and various agricultural magazines.

The programs presented at the station are varied, leaning slightly toward those of interest to rural areas, since a large portion of the listening audience either resides in rural areas or are from rural areas within a four-state area.

One of the newest features of the station is Muzak, which tapes music to various areas of town on a 24-hour basis. Another function of the station is its participation in Civil Defense as a CONELRAD switching point. Facilities are set up which enable station personnel to receive news of enemy aircraft and unusual weather conditions, in which case the news is broadcast to its listening area.

After the dinner meeting, the members were taken on a conducted tour of the station itself, in which they were shown the tower, the tallest man-made structure in the world. The tour was conducted by technicians of the station, who explained various aspects of the intricacies of broadcasting, such as transmitters, screening of programs, and broadcasting problems.

Northeastern University — Student chapter members are shown leaving the U.S.S. Wasp at the Boston Naval Shipyard after a tour of the aircraft carrier's communications and electronics facilities. Capt. Charles P. Skinner, assistant advisor to the chapter, appears in the foreground.

London

The first meeting of the 1958-59 season was held at the Columbia Club Hotel on September 23rd. Seventy-seven members and guests were present.

Guest speaker for the evening was Brig. Gen. W. D. Hamlin, US Army, Chief Signal Officer, US Army Command Europe. General Hamlin who came from his headquarters at Heidelberg, Germany, spoke on the "Military Aspects of Communications-Electronics Within the European Theater."

Louisiana

An authoritative talk on missiles was presented at a joint meeting of the local AFCEA chapter and the Foreign Policy Association of New Orleans, which took place on October 6th at the Naval Air Station, Commissioned Officers Mess.

Featured speaker was Erich W. Neubert, Director, Systems Analysis and Reliability Laboratory, Army Ballistic Missile Agency, Redstone Arsenal, Alabama. One of nine supervisors working directly under Dr. Wernher von Braun, Mr. Neubert discussed the country's ballistic missile program, which is so much in the news these days. Working on REDSTONE and JUPITER, Mr. Neubert has the present assignment of helping develop the new PERSHING surface-to-surface ballistic missile.

The following new committee chairmen were recently appointed: J. B. Lutenbacher, publicity; R. D. Sparkman, membership; and P. B. Clerc, program.

New York

The first dinner meeting of the Fall-Winter season was held on September 24th at the Hotel Belmont Plaza. President Ludwig Engler congratulated Brigadier General W. Walter Watts of RCA and Joseph E. Heinrich of ATT on their recent USAR appointments. Congratulations were also extended to Dr. George W. Bailey of IRE for having received an honorary Doctor of Science Degree from Lawrence College, Appleton, Wisconsin.

Lt. Gen. Francis H. Griswold, USAF, Vice Commander in Chief of the Strategic Air Command, was the honored guest and speaker of the evening. General Griswold stated that "SAC was one of the largest customers of the electronics industry." He described the operation of our Strategic Air Command and highlighted some of the latest Air Force communication techniques.

Northeastern

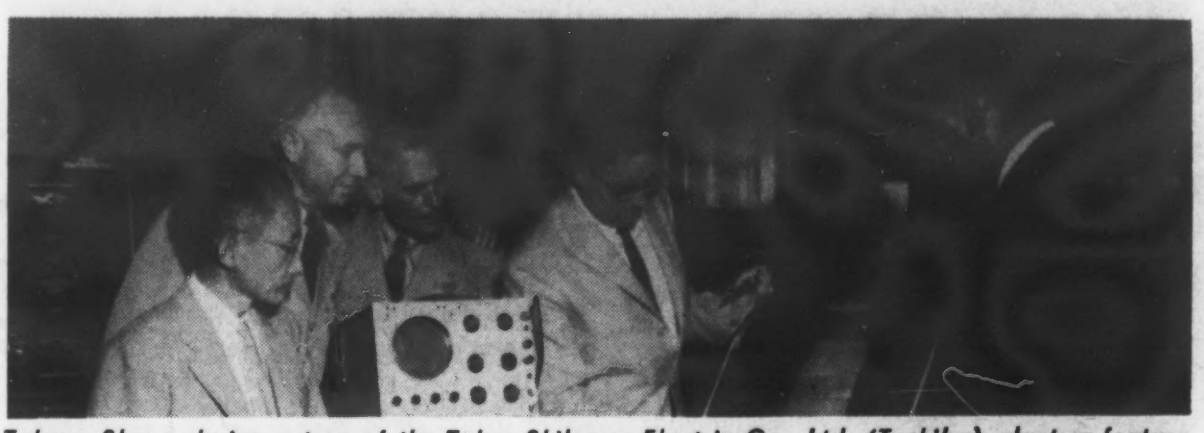
Members of the Northeastern University Student Chapter were guests of the U.S. Navy recently at the South Boston Annex, Boston Naval Shipyard.

Purpose of this field trip was a guided tour through the giant aircraft carrier, *U.S.S. Wasp*. Some thirty student members and their faculty advisers participated. Chapter membership is open to non-ROTC students and cadets

Scott-St. Louis—Col. Robert E. Herndon, Jr., USAF, Commander of the Aeronautical Chart and Information Center, addresses the October 3rd meeting. At left is Mrs. Donald C. Doubleday (Maj. Gen. Doubleday is Commander of the AACS), and at right, Chapter President B. Rogers Robards.

with interests in electronics and photography.

Chapter President Edward T. O'Keefe, Jr., '59 E, has been busy checking rosters of cadets bound for Fort Devens, Mass., for helicopter flights, next field trip to follow the expedition to the *Wasp*, and one of the high points of AFCEA fall and spring programs. He says also that AFCEA members have been offered the use of ROTC dark room facilities including 4 x 5 enlarging paper. They may also take advantage of camera instruction with the Signal Corps Speed Graphic camera which is available.



Tokyo—Shown during a tour of the Tokyo Shibaura Electric Co., Ltd. (Toshiba) plant, a feature of the chapter's September 24th meeting, are, left to right: Mr. Isiguro, Mgr., International Dept. of Toshiba; Lt. Col. John M. Goodman, Dir. of Plans and Operations Div., USARJ Signal, and chapter vice pres.; Cdr. Harold B. Kirkham, Operations Officer, USN Communications Facility, Kamaseya, and chapter secretary; Harry M. Parker, Far East Regional Supervisor of General Electric Co., and M/Sgt. Eugene Ruffin, NCOIC Electronics Equipment Repair, Signal Comms. Agency, Japan.

Pittsburgh

Members of the Pittsburgh Chapter and its student section at Carnegie Tech turned out in good number for the traditional chapter picnic which opens each year of activity.

Held at the North Park Lodge on October 4th, the program featured golf, fishing and horseshoes — and a fried chicken dinner.

Bill Stetson of Saxonburg Ceramics chairmanned the event.

Rome-Utica

The following account of the September 24th meeting appeared in the *Rome Daily Sentinel*:

"James E. Bates, Manager of the Processing Development Department at Ansco Division of General Aniline and Film Corporation discussed the technical aspects of colored photography before the Rome-Utica Chapter of AFCEA.

"The chapter, meeting at the Griffiss AFB Officers Club, heard Bates review the formation of the visible spectrum by the dispersion of white light as applied to the production of colored film.

"Assisted by Robert J. Hinman, Government Service Dept. of Ansco, Bates pointed out that the subtractive primary colors, magenta (reddish), cyan (blueish) and yellow, form the basis of color photography in lieu of the primary colors of red, blue and green.

"The group was shown colored slides illustrating principles of color subtraction, errors made by amateur photographers, as well as suggestions for obtaining better color photos.

"A 16 millimeter colored film, taken with high-speed film, was shown, illustrating the wide sensitivity range of the film and several applications of color photography taken at 3,000 feet per second.

"The speaker was introduced by Murray Socolof, program chairman. William Roberts, chapter president, outlined the AFCEA schedule for the year."

San Juan

Special guest at the September 25th meeting was Wyman S. Borden, past president of the chapter, who gave a brief talk on telephone communications in Mexico where he is now stationed with the International Telephone and Telegraph Corporation.

Used for the first time at this meeting were individual identification badges bearing the AFCEA seal in gold on a blue ribbon, which were donated by the Radio Corporation of Puerto Rico. The chapter extended a vote of thanks to Chapter President Kenneth Barbier, who is president of Radio Corporation of Puerto Rico, and member Salvador Brau, who designed the badges. The badges were so effective that the chapter passed the requirement that they be worn at each chapter meeting, with a fine imposed on any member failing to do so.

Joaquin Gandia, one of the instructors in the advanced communications course being conducted by the Vocational School, reported that the school program was progressing satisfactorily. Assisting the Commonwealth Department of Education in setting up a technical training program in the communications and electronics fields is a chapter project.

The program portion of the meeting was a film on "Guided Missiles" shown by the U.S. Army Signal Corps. The dinner-meeting was held at the Fort Brooke Officers Club.

Scott-St. Louis

"The Mission of ACIC," an illustrated talk by Col. Robert E. Herndon, Jr., USAF, Commander of the Aeronautical Chart and Information Center, St. Louis, was the program feature of the October 3rd meeting.

Colonel Herndon gave a detailed description of the mission, organization and function of the ACIC. He supplemented his presentation with illustration and numerous representative examples of charts and other products prepared and produced by the Aeronautical Chart and Information Center.

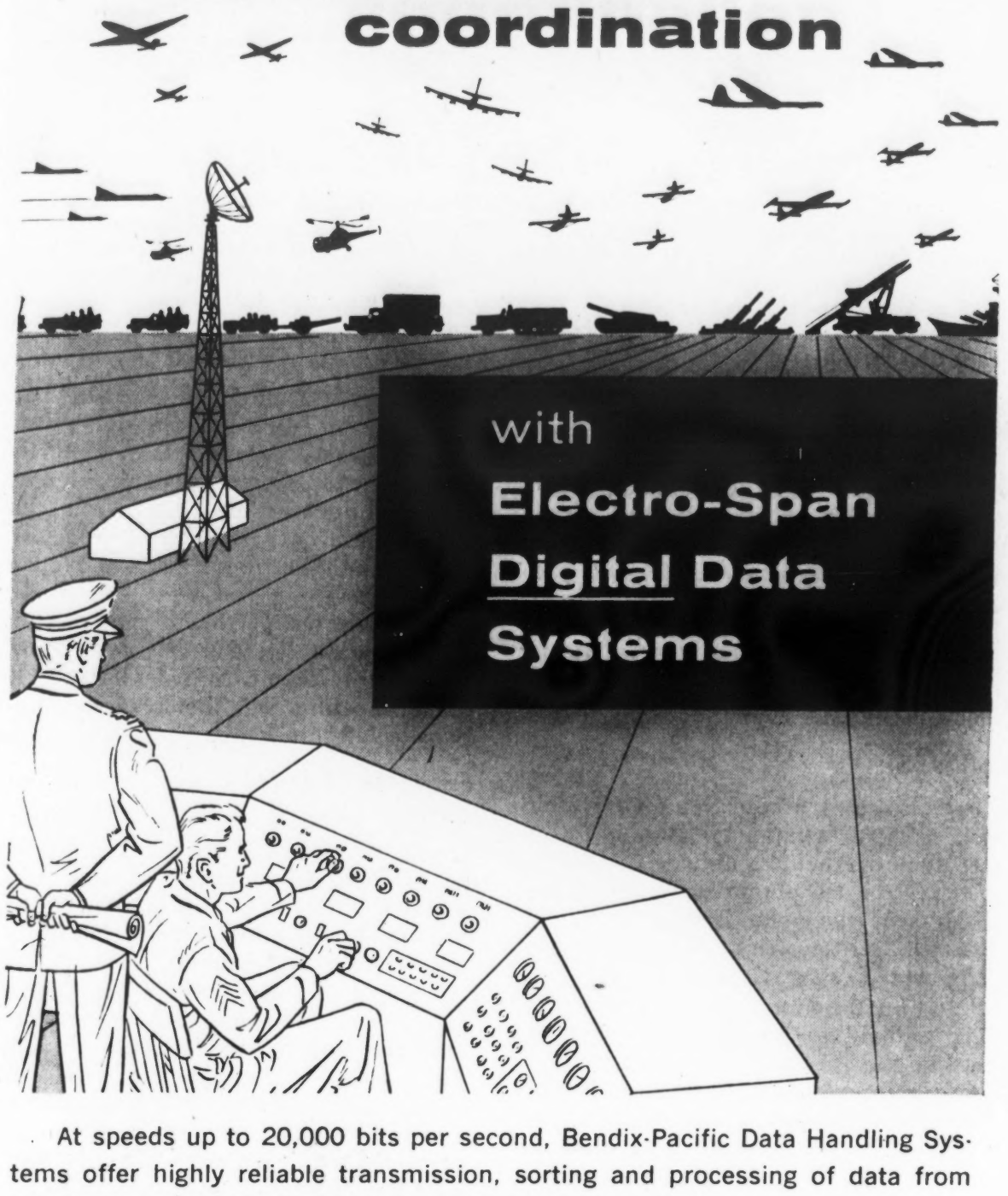
The dinner-meeting was held at the customary meeting place, Augustine's Restaurant in Belleville.

Seattle

Program for the October 8th dinner-meeting was conducted by Lee Rabie of Hawthorne Electronics on the subject of the Tektronix cathode ray tube.

Washington—At its October 2nd meeting, the chapter lauded the history-making trip of the U.S.S. Skate under the Polar ice pack. A record number of members and guests turned out for the occasion. Distinguished Naval guests pictured above are, left to right: Capt. Richard B. Lynch, Commander, Submarine Squadron 10, New London, Conn.; Cdr. James F. Calvert, Commanding Officer of the U.S.S. Skate; Vice Adm. Thomas S. Combs, Deputy Chief of Naval Operations; Chapter President John R. O'Brien; Lt. Albert Kelln, Electronic Officer, U.S.S. Skate; and Lt. George Barunas, Communications Officer, U.S.S. Skate.

HIGH SPEED DATA HANDLING
for weapons coordination



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Mr. Rabie first showed a color and sound film on the design and construction of the Tektronix tube. He augmented the film with a discussion of some of the measurement possibilities using Tektronix equipment once a voltage change has been established, even at rates of milli-micro-seconds. He also made mention of a new lightweight transistorized oscilloscope and a new strain-gauge scope being developed by the Tektronix Company.

During the business session, each member and guest introduced himself.

Col. Carl H. Hatch, SigC, Commanding Officer of the Alaska Communications System, and Cdr. Leo J. Larkin, USNR, District Communications Officer, 13th Naval District, offered their whole-hearted support in the promotion of AFCEA activities.

Chapter meeting dates are set for the first Wednesday of each month at the Benjamin Franklin Hotel.

Southern Connecticut

John N. Higgins of KIP Electronics Corporation has been named president of the chapter for 1958-59.

The other officers are: vice presidents —Robert R. Brooks, Dictaphone Corporation; Frederic Lawler, SoundScriber Corporation, and Rodney E. Nelson, Machlett Laboratories, Inc.; secretary —Joseph A. Leopold, Dictaphone; treasurer — Edward A. Chmielewski, SoundScriber.

Tinker-Oklahoma

A tour of the 33rd Air Division facilities featured the October 16th meeting. Following dinner at the Tinker Air Force Base Officer's Club, the party was divided into two groups, each escorted by a control officer assigned by the 33rd Air Division. Buses were provided to transport the two groups from the Officer's Club to the 33rd Air Division Area and return.

The tour included visits to the Direction Center and the Control Center. The escort officers and staff officers of the Air Division and the local AC&W Squadron gave briefings on the operation of the Air Defense System in the Oklahoma Area. Several members brought their wives to the meeting, thus giving them an opportunity to understand better the relationship between the Air Defense System and the Civil Defense Program.

Tokyo

The chapter held its fall meeting at the Colonial Club in Yokohama on September 24th. The meeting, sponsored by the Navy, was attended by over one hundred members and guests, both military and civilian, from the Army, Air Force and Navy in Japan, and representatives from Japanese and American industry.

The meeting, presided over by Capt. Frank A. Dingfelder, USN, chapter president, began with a luncheon at the Colonial Club, followed by a visit to the General Electric Far East Air Force

(*Continued on page* 52)

ITEMS OF INTEREST

From Government, Industry and the Services

"3-D" Radar

A new device, which is considered one of the most important advances made in electronic detection since the development of radar, has been revealed by the Department of the Army. It is a "three-dimensional" radar which detects airborne targets at extreme range and for the first time simultaneously computes distance, bearing and altitude.

Called Frescanar, the new radar, which was developed by Hughes Aircraft Company, Fullerton, California, is the eye of "Missile Monitor," an Army air defense guided missile fire distribution system for mobile use with a field army.

Five basic advantages of the new "3-D" system over conventional radars are cited:

1. Range performance. Frescanar concentrates all available power in sharp pencil beams of energy flashing on and off in fan-shaped array to pin-point targets at great distance with extreme accuracy.

2. Single antenna and operator. Conventional systems need two or more radars, operators and master consoles to achieve similar results. Frescanar needs only one of each, sharply reducing weight, bulk and personnel to make transportation with other Army field units easier. Use of transistors further cuts size and increases ruggedness for movement.

3. Triple function. Frescanar computes range, bearing and altitude at the same time.

4. Greater speed. All three types of data-range, bearing and altitude are transmitted to missile batteries, helping them to direct missiles on targets much more rapidly.

5. Sees more targets clearer. Electronic beam scans rapidly and greatly increases number of targets which can be tracked at the same time, provides better separation of closely spaced targets with minimum of ground clutter and pinpoints targets faster.

The Army system developed by the Hughes Ground Systems Group, under an Army Signal Corps contract, consists of one equipment van, one power truck and one antenna trailer. The equipment van houses all radar gear except the antenna.

MARS January Speakers

January speakers for the First Army Military Affiliate Radio System (MARS) Technical Net (SIGNAL, Sept., 1958, p. 50) will include:

January 7: "The Modern Approach to Front End Receiver Design" by Marvin M. Klein, Manager Engineering, Research and Development, Lewyt. Mfg. Corp.

January 14: "Trak—Morse Code to Teleprinter Converter" by Thomas Waldron, Group Leader, Information Conversion Group, CGS Laboratories.

January 21: "Phone Patches" by Robert W. Gunderson, Editor, Braille Technical Press.

January 28: "Measurement of Nuclear and X-Ray Radiation," by William Minowitz, Physicist, Nuclear Products Division, Amperex Electronics Corp.

The talks will be held on Wednesday at 9 PM EST on 4030 KC, upper sideband.

High Vacuums

Cryopumping, an unconventional technique for producing extremely high vacuums, is said to promise substantial savings for research and industrial uses. It is already employed for missile research in a University of California wind tunnel.

Cryopumping produces such low temperatures that all of the air in a chamber of wind tunnel freezes to a solid, leaving a high vacuum.

Dr. Raymond L. Chuan. Director of the University of Southern California's Engineering Center, developed the first practical, large-scale application of the technique—a hypersonic wind tunnel used to test missile models under high altitude atmospheric conditions. Arthur D. Little, Inc., research and engineering company of Cambridge, developed the cryopump used to freeze air out one end of the tunnel, providing high-speed air flow over the missile models.

With the cryopump, it is now possible to produce extremely low pressures (about one-millionth of our normal atmospheric pressure) economically enough for large scale industrial applications. The temperatures involved are those believed to exist on the dark side of the moon.

Revised Regulation

A revision of Part 2, Section IX, of the Armed Services Procurement Regulation on the subject of "Data and Copyrights" was scheduled for publication last month.

Perkins McGuire, Assistant Secretary of Defense for Supply and Logistics, in making the announcement, said that some of the more significant changes in the revision are:

a. The overlapping of definitions is avoided and uniform treatment of contractors is expected to be obtained in the purchase of data. The definitions of "design data" and "proprietary data" are clarified so as to make them mutually exclusive. This has been done by first defining "proprietary data" with examples and then defining the remaining types of data as "other data."

b. The provision of a contract clause as a "built-in" amendment to specifications for data, which has the effect of neutralizing the requirement in specifications for "proprietary data," so that "proprietary data" must be specified in the contract schedule when it is desired to be obtained.

c. The inclusion of policy and safeguards for the protection of proprietary data for an item developed at the contractor's own expense similar to the protection now afforded to data for standard commercial items.

In addition to the more significant changes, the revision includes other changes intended to facilitate the making of contracts which require the furnishing of technical data.

Copies of the new regulation (Revision No. 38 to the Armed Services Procurement Regulation) will be on sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Nuclear Clouds Tracked

Radar may now make it possible to spot and track nuclear clouds with a relative degree of accuracy.

Tests conducted by the Signal Corps indicate that the Army's advanced weather radar systems, ordinarily used to detect storms and aid in forecasts, may also help to warn soldiers and civilians on probable areas of radioactive fallout from nuclear explosions.

Proved highly effective during high-yield nuclear tests, the Army's radar equipment measured the size and plotted the course of "hot" clouds. During the tests, the first photographs of a radar scope showing the nuclear mushroom were made with a special camera and successive film exposures showed the formation, rise and drift of the characteristic cloud. The nuclear clouds were tracked for as long as two hours.

A special advantage of radar is that it works during darkness and other periods of low visibility, which prevent visual triangulation and aircraft techniques for measuring nuclear clouds.

As in the tests, it was pointed out that spotting and tracking by this means would depend on some preknowledge or probable nuclear burst areas or having a burst that was low enough to suck up dirt particles.

The radar used in the tests is the same type currently used to detect the approach of rain, snow, sleet, electrical storms, hurricanes and weather fronts which might generate tornadoes.

The tests were carried out under the direction of the army scientist, Dr. Donald M. Swingle, Chief of the Meteorological Techniques Branch, U. S. Army Signal Research and Development Laboratory, Fort Monmouth, N. J.

"Important Developments"

An experimental system was called "perhaps the most important development in broadcasting in the last 30 years" and demonstrated recently by Radio Corp. of America. It is a new method of compatible stereophonic broadcasting for standard AM radios.

Dr. James Hillier, RCA vice president and general manager of the David Sarnoff Research Center, stressed that the method is in the research stage and added, "This system demonstrates the practicability of stereophonic amplitude modulated broadcasting and reception with a single receiver and a single transmitter operating within the presently assigned frequency of each AM broadcast station."

In the system, each of AM's two sidebands carries a different stereo channel. The product is so transmitted that standard AM receivers can pick up a fully balanced, mixed signal, while specially designed receivers—with two matched speakers and a separation circuit—can reproduce stereo.

According to Dr. Hillier, AM stereo would be suitable in particular for car radios.

$7 Million

Production orders placed with the electronics industry for travelling wave tubes are expected to total $7 million in 1959, an RCA engineer said recently.

Travelling-wave tubes of the types developed by RCA are used in many military applications involving airborne electronic countermeasure equipment, and portable ground-operated microwave communications systems.

Hans Jenny, Manager, Microwave Engineering, RCA Electron Tube Division, made the prediction at a session of the Institute of Radio Engineers, 1958 Electronic Devices Meeting, which was held in Washington during October.

Honor Cadets at Norwich University

Five Senior Signal Corps cadets at Norwich University have been designated as distinguished Military Students. They are Harold P. Grout, Harold L. Leland, Raymond G. Irvine, Jr., Walter J. Rizzi and Robert C. Young.

This distinction carries with it the opportunity for the student to apply for a commission as a second lieutenant in the regular army after graduation.

To earn this distinction a student must stand in the upper half of his class in academic subjects and in the upper third of his class in military subjects. He must have displayed the characteristics of leadership as well as the mental, moral and physical qualities necessary for a commissioned officer.

Names in the News

Commodore A. J. Spriggs, USN (Ret.), Vice President in charge of Packard-Bell Electronics Corporation's Eastern operations, has been granted a leave of absence to accept an appointment by the Business and Defense Services Administration of the U.S. Department of Commerce. **Robert Adams**, who has been named manager of eastern operations for Packard-Bell, will assume the duties of Commodore Spriggs.

Francis H. Lanahan has resigned as President of ITT's service organization, Federal Electric Corporation, in order to take the new post of President of International Electric Corporation. ITT recently established the new unit to manage production of a world-wide electronic control system for the Strategic Air Command.

Guy L. Antrim, Jr., has been assigned by Burroughs Corporation, Detroit, as military relations representative at Colorado Springs. Mr. Antrim's work will be to facilitate liaison with the Air Defense Command and North American Air Defense Command with regard to systems being designed, developed and manufactured for the Air Force by Burroughs.

Forest G. Hogg has been appointed resident area representative for Motorola Military Electronics Division's permanent area office located near the Army Electronics Proving Ground at Fort Huachuca.

Phillips Eastman, Jr., has been appointed manager of the Denver facility of Hallamore Electronics, a division of The Siegler Corporation. He will be in charge of field installation, final acceptance testing and customer training for ground facility instrumentation the Hallamore Division is currently supplying to the Titan missile program at The Martin Company.

Brigadier General Monro MacCloskey, USAF (Ret.), has been appointed Assistant to the President of the Crosley Division, Avco Manufacturing Corporation. Before his retirement from the Air Force in June 1957, General MacCloskey was commander of the 28th Air Division (Defense) at Hamilton Air Force Base, California.

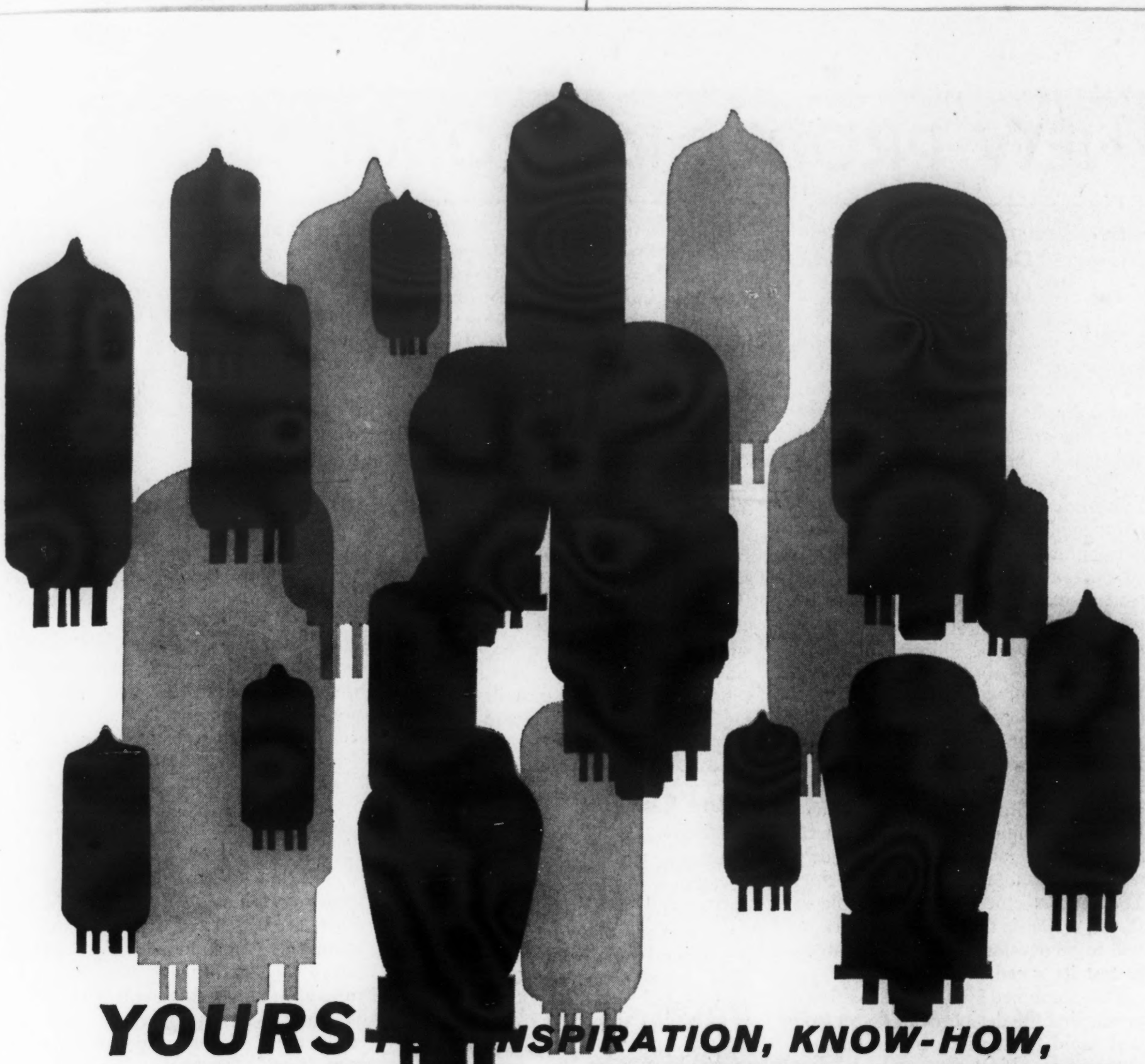
Mansfield D. Sprague has been elected Vice President for public and industrial relations of American Machine & Foundry Company. Mr. Sprague was formerly Assistant Secretary of Defense for International Security Affairs.

Frederick R. Lack has been elected a director of Hazeltine Corporation. Mr. Lack retired in August as a Director and Vice President of the Western Electric Company.

Ben E. Swanson will head a new organization devoted to systems engineering which has been formed by Kellogg Switchboard and Supply Company. Mr. Swanson is a charter member of AFCEA.

Captain W. A. Ellis, USN, has been named Assistant Director of Naval communications.

Albert Tradup has retired, after 43 years with Bell Telephone Laboratories. Since 1951, he has been Director of Military Program Planning.



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NEW PRODUCTS FROM INDUSTRY

Ultra-Sensitive Infrared Detector

The ever increasing importance of infrared systems in military and scientific fields has brought forth from scientists at Westinghouse, Pittsburgh, a new ultra-sensitive detector that is claimed to respond to less than one-twentieth of a billionth of a watt of infrared (heat) radiation.

The new infrared detector is a "photoconductor detector"— the photoconductor being composed of germanium (the same basic semiconductor material from which most transistors are made) which is made sensitive to infrared by adding an impurity, gold.

In addition to its sensitivity, a major advantage of this detector over the varieties is said to be its response to the longer wave lengths of infrared, corresponding to lower temperatures. It is also said to be sensitive to infrared up to a wave length of 10 microns and is about 10 times faster than any previously measured photoconductor detector. The new detector is supposed to be so fast in response that special apparatus had to be developed in the laboratory to test its speed.

This combined speed and sensitivity means that the detector can detect tiny and rapid fluctuations in the temperature of an object even at body temperature and below, and thus should increase its usefulness in medical research, astronomy, exact scientific experimentation and industrial control.

New Roles For Ultronic Energy

New potential applications of ultrasonics have been made possible by the development of a new and improved ultrasonic transducer—a device that changes electrical energy into mechanical sound vibrations.

Its developers, Westinghouse Electric Corp. of Pittsburgh, Pa., consider the transducer's new "radical" design a significant breakthrough, resulting in a device twice as efficient and considerably more compact than any existing units of comparable power. Heretofore, ultrasonic equipment was considered too costly, too inefficient and too low in useful power to be broadly assigned to many of the tasks it is capable of performing.

Of a general type called "magnetostrictive," the transducer is described as most effective for generating large-scale ultrasonic power. The device's "spaced laminations" represent a new kind of construction not found in the usual magnetostrictive transducer. Compared to conventional magnetostrictive transducers, spaced lamination is said to give twice the useable ultrasonic power for the same electrical input. It is claimed to have given the transducer the character of a component whose perfection will make ultrasonic energy abundantly available in the future.

Among ultrasonic manufacturing operations made practical by spaced-lamination transducers are electroplating aluminum bus bars with silver, cleaning printed circuitry boards for TV and radio receivers and decontaminating pieces of nuclear apparatus.

"One Cabinet" Repeater Station

Allen B. Du Mont Laboratories has introduced the first two-way repeater station, for land-mobile communications systems allowing cross-over of frequency bands, which can be packaged in one cabinet as standard equipment. It is designed to operate in both directions with any combination of two of the three frequency bands assigned by the FCC: the 25-54 mc band and the 450-470 mc band, the 144-174 mc band and the 450-470 mc band, and the 25-54 mc band and the 144-174 band.

The new repeater station, by incorporating both the communications channel and the relay channel circuitry as well as all interlinks in a single cabinet is said to cut space and cabinet requirements in half. Previously, cross-over operation for repeater stations made it necessary to install two cabinets for each cross-over relay link into the network.

In addition to space and cost saving, the repeater has a technical advantage in being fully coordinated at the factory as a single package. Simplicity of servicing and testing are possible due to the open mechanical construction of all chasses and circuitry.

All cabinets have similar physical dimensions: 72″ high by 22″ wide by 14″ deep, and they all weigh 450 pounds. All units are operated on 117 volts A.C.

Loudspeaking Transistor Phone Unit

Complete elimination of the usual control box and the 110V power requirement of former loudspeaking telephone installations has been accomplished with the development of a new transistorized loudspeaking telephone, called the Speakerphone (Type-88).

The unit is described by its developers—General Telephone Labs. of Northlake, Ill., as consisting of a modified Type 80 telephone connected to a miniature loudspeaker cabinet by a 3-conductor cord. Since there is no need for a control cabinet, and since the unit is powered by current taken from the telephone line itself, installation is identical to that of a standard telephone. Moreover, the cord from the speakerphone can be terminated in a standard extension telephone plug, thus permitting the instrument's use as a portable telephone.

The telephone itself houses the usual type 80 components plus the transmission elements of the amplifier circuits which incorporate printed circuitry. Included in the housing are a push-and-turn button for on-off operation, a volume control knob and a neon pilot lamp which indicates when the loudspeaker and microphone are "live." Depressing the push-and-turn button also enables the user to cut off the microphone.

"Liquid Flywheel"

A device for controlling space craft, to keep a vehicle properly oriented during its flight through space, has been invented by Robert P. Haviland, a space engineer for General Electric Co., of Philadelphia. The apparatus, called a "liquid flywheel," uses a hoop-like arrangement of pipes through which are pumped a liquid at varying speeds. The change in the liquid determines the amount of force applied in any one direction. According to Mr. Haviland, such a control device is needed because the nearly perfect vacuum conditions of outer space will mitigate against using fins, rudders, and other devices dependent on air drag. The pipe arrangement is said to provide the added advantage of storing needed liquids in the hoops and then using this stored liquid as the force medium.

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New Small Transistorized Computer

An airborne general purpose D.C. analog computer using transistor circuitry has been developed and built by Autonetics, a division of North American Aviation, Inc. It is to be installed in an Air Force supersonic fighter for use by the NASA Flight Research and Instrumentation Div.

Believed to be the first of its kind by Autonetics officials, the computer will be used in the air for flight and fire control and guidance research problems. The complete airborne package occupies 21.4 cubic feet. This would be considerably smaller than a comparable general purpose analog computer using vacuum tubes instead of transistors which officials say would occupy approximately 240 cubic feet of space. The new computer is claimed to be more reliable, have less weight, use less power and to be extremely mobile due to its transistorized circuitry.

Besides its original airborne application, the new computer can be used wherever differential equations are involved. Other uses include rocket and jet engine design, thermodynamic studies, nuclear reactor design, flutter analysis, flight simulation and pilot training, hydraulic valve and servomechanism design, and for industrial process control. Officials say it can also be used as a laboratory tool where size and weight advantages should prove particularly useful.

CC Camera Sees In Darkness

According to engineers at General Electric Co. in Syracuse, New York, the glow of a cigarette lighter in a completely dark room would produce sufficient light for their new cylindrical closed-circuit camera to transmit a "clear picture of the entire room."

Believed to be the first camera able to pick up a signal below the level of of human sight that does not depend on a separate infra-red light source, the unit is one of high sensitivity—the result of a newly developed image orthicon tube together with new circuitry. However, the camera basically functions on a principle similar to that of an ordinary TV camera.

Images are picked up by the new image orthicon tube, so sensitive to light that it can "see" a subject with only 1/1,000,000 of a foot lambert (unit of brightness) of light present. The image is then amplified to a useable level by a newly designed high-gain preamplifier. Both the new image orthicon tube and the preamplifier are said to help minimize "noise" or snow on the screen.

Eyeglass Hearing Aid

A self-adjusting sound plate for transmission of sound to the inner ear by bone conduction incorporated in a new eyeglass hearing aid was developed by Zenith Radio Corporation of Chicago.

Nothing is worn in the ear. To conduct sound vibrations, the sound plate fits on the mastoid bone which in turn conducts sound to the inner ear. The sound plate, attached to the temple bar of eye-glasses, is about the size of a penny and is designed so that it vibrates independently and eliminates temple bar vibration common in conventional bone conduction.

The components of the hearing aid —4 transistor amplifier circuit, receiver, volume control, and microphone—are encased in the temple bar. Fingertip volume control allows the wearer to adjust sound to the exact loudness required. The hearing aid is powered by a tiny mercury battery in a swing out compartment and also contains a spare battery compartment that provides the user with a reserve source of power at all times.

New Literature

Stereo Talk

Music has taken on a new quality, a new exciting vitality with the production early this year of a new system of disc recording, a system that produces the illusion of depth by means of dual audio recording on a single disc. With the adoption of this new stereophonic system, industry has unleashed a flood of stereo records and equipment now reaching the market. But what is stereo? How does it work? How can you get two separate sounds out of the same record groove?

A 4-page bulletin—the first of a series of "Stereo-Talk" bulletins being published by CBS-Hytron—provides a most interesting description of how a stereophonic record is produced using the 45/45 Westrex system and how the playback stylus motion is converted into separate signals for each channel. A second bulletin concerning itself with the all-important stereo cartridge explains how it permits the reproduction of recorded sound from the new stereo discs. In order to benefit from its full capabilities, it is generally believed that some knowledge of its characteristics and of the stereo phenomena itself is very desirable.

Designated respectively "An Introduction to Stereophonic Sound" (E-305) and "Hints On Using The Columbia CD Stereo Cartridge" (E-306), the two brochures are available at no cost from CBS-Hytron Advertising Service, Parker St., Newburyport, Mass.

Electron Tubes in Critical Environment

The Air Force has recently released a report to industry that reviews the state of research and development of electron tubes capable of operating in critical environments of high temperature, rough usage and nuclear radiation.

A "critical environment" is defined in the report as one in which all tube parts will undergo long-time exposure to temperatures of at least 500C, severe vibration and shock, and high levels of nuclear radiation.

The report is divided into four major sections. One reviews the present state (to the date of the report) of high temperature tube development. In this the tubes are divided into three general service ranges, and progress and development in each is discussed. In a section on materials and techniques the major areas of tube technology are discussed, and radiation damage to tubes is treated in another section. The final section summarizes results of the extensive investigation and discusses areas of technology requiring additional research.

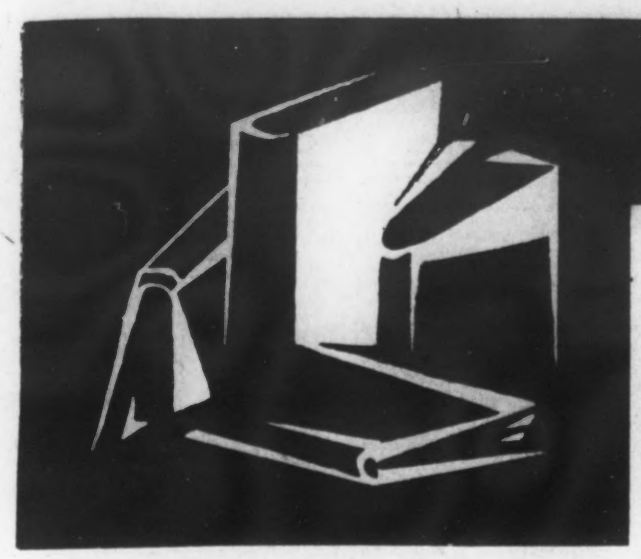
The report, PB 131852 *Electron Tubes for Critical Environment*, W. H. Kohl and P. Rice, Stanford Research Institute for Wright Air Development Center, Mar. 1958, may be ordered from OTS, U.S. Department of Commerce, Washington 25. It contains 228 pages, price $3.50.

Satellite Manuel

For volunteer observers or those interested in predicting the course of earth satellites, a new manuel entitled *Simplified Satellite Prediction from Modified Orbital Elements* has been published by the National Academy of Sciences.

Information therein, compiled from IGY world warning stations and volunteer tracking groups, will aid observers in any locality to figure out where to look for satellites if they know the inclination of the satellite's orbit plane to the equator and the distance to the earth's center from the orbit's low point.

At a price of $1.00, the manual is available from the Academy's Publications Office, Washington 25, D. C.



Books

CHANCELLORSVILLE, by General Edward J. Stackpole. The Stackpole Company, Harrisburg, Pa., 1958. 372 pages, $5.75.

Civil War fans, historians, Southern patriots who are tired of having defeat held up to them, and anyone who enjoys informative and good reading, is bound to be interested in this new book by General Edward J. Stackpole, author of two other popular Civil War books. It is the story of Lee's greatest battle, Chancellorsville, where the brilliant and aggressive Lee achieved victory with 60,000 troops against twice that number of "Fighting Joe" Hooker.

Against the heavy odds of Hooker's confidence, numerous troops and a masterly plan to surround Lee on both sides, the Virginia general threw the Union Army off balance by neither withdrawing nor defending his position as had been expected. Instead, he decided to attack.

There is no suspense as to how the battle ended, but the account of Lee's decision to attack, his brilliant tactics, the temporary setback caused by Jackson receiving a fatal wound, Stackpole's insights into the various personalities involved make exciting and dramatic reading. The clear writing and objective description is further illuminated by an abundance of illustrations, contemporary engravings, photographs and a broad range of carefully developed strategic and tactical maps.

A PSYCHOLOGICAL WARFARE CASEBOOK, by William E. Daugherty and Morris Janowitz. The Johns Hopkins Press, Homewood, Baltimore, Md. 880 pages, $12.50.

An awareness of the importance and the dynamic character of the activities encompassed by such terms as psychological warfare, propaganda, mass communications, the battle for men's minds, etc., is growing in evidence through the wide range of thought relating to it. There is, however, a great diversity of opinion as to the choice of any one of these terms for general adoption and a small unanimity of view as to acceptance of any one definite code or set of principles that would be considered currently conductive to sound operations. Consequently, the tentative guiding principles in this book are proposed by illustration through the case-study method.

Illustrations take the form of factual examples drawn from history of American use of "psywar" techniques, from the Revolutionary War up through post-World War II experiences. One final chapter treats selected cases of Soviet usage of these techniques.

Of absorbing interest are the included profiles of a few outstanding propagandists, definitions of political and military objectives, discussions of media methods and techniques together with evaluation of their effectiveness.

The all-important objective in the preparation of the case material has been one of emphasizing crucial problems which appear to highlight principles believed to be generally if not universally—applicable to future psychological warefare operation. Such a study, representing the writings of 73 experts in its documentation, sets forth an unprecedented collection.

TURNING POINT, Edited by Philip Dunaway and George de Kay. Random House, New York. 432 pages, $5.00.

History is made by men. And out of each life has come a moment of stress, of revelation, of victory or adversity that has revealed these men and made history. *Turning Point* is an interesting collection of these moments of decision, of triumph, of truth, written by and about forty men and women each of whom has reached his own fork in the road.

From as disparate backgrounds as Winston Churchill and Babe Ruth; from as diverse interests as Ludwig von Beethoven and Dwight D. Eisenhower, from all over the world, from all times, the pitch, the kernel, the essence of each man is revealed. Great and powerful, famous and infamous, driven and weary, mad and moonstruck and as widely varied as Socrates, Joan of Arc, Hermen Melville, Robert E. Lee, Madame Marie Curie, The Wright Brothers, Aaron Burr, Edward VIII, these molders of history have nothing in common but their particular moment which in one way or another lights up the inner being of each of them and in turn has decided a portion of history.

CLOSED-CIRCUIT TELEVISION SYSTEMS, Color and Monochrome, prepared by and available from Government Service Dept., RCA Service Co., RCA, Camden, N. J. 8½" x 11", 348 pages, $4.50.

As the number and variety of uses of Closed-Circuit TV continue to grow, one begins to appreciate the potential expansion of this practical electronic tool into virtually all fields of human activity. Those of many different occupations who are faced with the resultant need of informing themselves about the subject will be greatly aided by this excellent work.

While the presentation is largely of simple and straightforward description understandable to the technically uninitiated, there is also included a considerable body of technical data. The work thus serves to inform managerial personnel concerned with planning, to furnish a review for technical personnel doing the system engineering, and to supply reference material needed by both in selecting the equipment that best meets their needs.

The volume is divided into 3 parts. Book I provides an over-all description of monochrome (black/white) TV, explaining fundamentals, describing commercially available equipment and discussing equipment characteristics to assist in proper engineering of CC systems to assure reliable performance under various environmental conditions. Book II contains a supplementary treatment of compatible color TV for CC use. Fundamentals are discussed at length, and sections devoted to characteristics and equipments parallel those of Book I although no duplication is made of information concerning principles common to both color and monochrome operation.

The "System Planning and Specific Applications" section is slanted toward military uses; however, the same principles apply for many similar industrial and training applications.

A final third part complements and illustrates Books I & II with representative samples of specific applications of CC systems now in use, intending to suggest many additional applications.

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All insignia may be ordered from: AFCEA Service Dept., 1624 Eye St., N.W., Washington 6, D. C.

Chapter News

(*Cont'd. from page* 44)

Depot and the Tokyo Shibaura Electric Co., Ltd. (Toshiba). The principal speakers at the luncheon were Harry M. Parker, Far East Regional Supervisor of the General Electric Co., and N. Shimomura, Chief Electronics Engineer, Tokyo Shibaura Electric Co., Ltd.

The chapter plans a preview visit in December to the new television tower in Tokyo followed by a visit through the Japanese movie industry at a subsequent meeting.

Washington

Cdr. James F. Calvert and members of the *U.S.S Skate* were honor guests at the chapter's opening luncheon meeting of the fall on October 2nd.

The Washington *Evening Star* reported the meeting as follows:

"The skipper of the *Skate,* one of the two atomic submarines that steamed under the North Pole last summer, says the vessel's feat of popping up in the midst of the ice pack in nine different places demonstrates that the Arctic Ocean has become a new area for military operations.

"At a luncheon meeting of the Washington Chapter of AFCEA at the Willard Hotel, Cdr. James F. Calvert said yesterday that the *Skate's* primary mission was 'to determine whether a submarine could be brought to surface in various parts of the Arctic Ocean.'

"Noting that the military usefulness of an ocean area is dependent on at least a periodic access—because 'you can't communicate or fire missiles if you can't surface'—the Commander said that the *Skate* surfaced nine times in 10 days, within 40 miles of the North Pole. On several occasions the submarine remained surfaced for some 18 to 25 hours, he added.

"This showed, he said, that the ice openings are permanent enough to be militarily useful, at least in summer.

"He told of the tricky business of surfacing his 90-yard submarine on the first try in a narrow opening only 150 yards long. He said he had to stop his vessel and bring it up very slowly.

"'When you do this you begin to think that anybody who tries it must have holes in his head,' Cdr. Calvert quipped.

"Because of the potential hazard of small pieces of floating ice, he said he had to lower his periscope for the final 20 feet before the *Skate* broke water. 'This is a real test of patience,' he added wryly.

"Cdr. Calvert told of the *Skate's* '2-hour trip around the world'—around the North Pole. He said the submarine steamed normally at a depth of 270 feet at a speed of 17 knots.

"Brig. Gen. Alvin Welling, District Engineering Commissioner, welcomed Cdr. Calvert and gave him the key to the city. The AFCEA presented the commander and his crew with diplomas in recognition of their contribution to national defense."

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Here are several good reasons why an AFCEA-SIGNAL membership is of importance to you. It affords chapter affiliation with friends in the electronics field. It creates a very congenial climate for the members of the civilian-military team to discuss and solve problems of mutual interest.

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Thirdly, the AFCEA Convention guarantees a highly intellectual and top side audience to hear presentations of technical papers on the latest in technical achievements and trends of the future. Members, guests and friends are given an opportunity to view first hand an entire display of products and/or services in an atmosphere of a masterfully coordinated technical trade show.

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Preserver of Peace . . .

Wrap-around bumper for a continent

NORAD

Headquarters—NORAD—Colorado Springs

Like a huge "bumper" wrapped around the North American continent and reaching down along both the Atlantic and Pacific shores, the North American Air Defense Command (NORAD) has been created for operational control of air defense units of the Army, Navy and Air Force of the U.S. and the RCAF Air Defense Command of Canada. Its field includes the vast area between the southern border of the United States and the northernmost limits of Canada and Alaska. Under the functional control of NORAD will be BMEWS (Ballistic Missile Early Warning System) and SAGE (Semi-Automatic Ground Control Environment) for the defense of specified sectors. In addition to its responsibility as prime contractor for BMEWS, the Radio Corporation of America is working on other important electronic assignments for NORAD.

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PERFORMANCE DATA

BANDS — L S C X X_b K_u K K_a

TYPICAL X-BAND RATINGS:

Power — 10 kw peak

Insertion Loss — 0.7 db
including ignitor interaction

Recovery Time — 1.5 μ sec.

VSWR — 8565-9487 $\leq$ 1.3
8490-9578 $\leq$ 1.6

Dimensions — approx. $\frac{3}{4}$" between flange faces

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